



THE CITY OF COLORADO SPRINGS
and the
PIKES PEAK RURAL
TRANSPORTATION AUTHORITY



INVITATION FOR BID (IFB)

SECTIONS B1 THROUGH B33 EXPLAIN IN DETAIL THE BID REQUIREMENTS

BID NUMBER: B16-T026 NS

FEBRUARY 3, 2016

N CHESTNUT ST OVER S DOUGLAS CREEK CULVERT REPLACEMENT

FOR

CITY OF COLORADO SPRINGS
PUBLIC WORKS/CITY ENGINEERING
&
PIKES PEAK RURAL TRANSPORTATION AUTHORITY

OFFERS DUE:

2:00 P.M., TUESDAY, MARCH 1, 2016

A PRE-BID CONFERENCE IS SCHEDULED

CONTACT
City Contracts
Nicole Spindler
Senior Contracting Specialist
30 S. Nevada Avenue, Suite 201
Colorado Springs, CO 80903-2599
Tel: (719) 385-5265
Fax: (719) 475-8477
E-mail: nspindler@springsgov.com

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SCHEDULE A**BID FORM**

The undersigned declares that they have carefully examined the bid information and complete solicitation (the term solicitation means the complete Invitation for Bid, I.F.B.) in submitting a bid for the **“N Chestnut Ave over S Douglas Creek”**

The bidder's signature will be considered acknowledgement of understanding and ability to comply with all items in this solicitation. If a bidder makes any changes or corrections to the bid documents (such as whiting-out, or writing over a figure, etc.), such changes or corrections must be initialed and dated by the person signing the bid prior to its submittal.

TOTAL BID will be evaluated and awarded as follows: The City of Colorado Springs intends to award a contract to the lowest responsible and responsive bidder as specified in Schedule B. See B.15 Basis of Award. Each bidder will provide pricing for each estimated quantity listed in the following schedule. See B.30 Period of Performance for specific award information.

OFFER**BID SCHEDULE A**

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT PRICE	EXTENSION
1	CLEARING	1	LS		
2	UNCLASSIFIED EXCAVATION	11160	CY		
3	STRUCTURE EXCAVATION	5282	CY		
4	STRUCTURE BACKFILL (CLASS 1)	4089	CY		
5	STRUCTURE BACKFILL (CLASS 2)	1796	CY		
6	REMOVAL OF ASPHALT MAT	1082	SY		
7	REMOVAL OF TREE	1	EA		
8	REMOVAL OF GUARDRAIL TYPE 3	220	LF		
9	REMOVAL OF CURB & GUTTER	295	LF		
10	REMOVAL OF FENCE (CHAIN LINK)	80	LF		
11	REMOVAL OF FENCE (WOOD)	68	LF		
12	REMOVE & RESET FENCE (CHAIN LINK)	209	LF		
13	REMOVE & RESET SIGN	2	EA		
14	REMOVAL OF SIDEWALK	174	SY		
15	REMOVAL OF PIPE (96-INCH CORRUGATED METAL PIPE)	25	LF		
16	REMOVAL OF PIPE (48-INCH CORRUGATED PLASTIC PIPE)	146	LF		
17	REMOVAL OF PIPE (36-INCH CORRUGATED PLASTIC PIPE)	66	LF		
18	REMOVAL OF MISCELLANEOUS UTILITIES	1	LS		
19	REMOVAL OF WATERLINE (12-INCH)	21	LF		
20	REMOVAL OF WATERLINE (24-INCH)	50	LF		
21	REMOVAL OF 8-INCH SANITARY LINE	213	LF		
22	REMOVAL OF DRIVEWAY	555	SF		
23	AGGREGATE BASE COURSE (CLASS 6)	534	CY		
24	ASPHALT CONCRETE PAVEMENT (GRADING S) (PG 64-28) (6-INCH)	1711	SY		
25	CONCRETE SIDEWALK (4-INCH)	437	SY		
26	CONCRETE SIDEWALK (6-INCH)	56	CY		
27	CONCRETE PEDESTRIAN RAMP	580	SF		
28	CONCRETE DRIVEWAY	69	SY		

OFFER

BID SCHEDULE A

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT PRICE	EXTENSION
29	CURB AND GUTTER TYPE 2	757	LF		
30	ENVIRONMENTAL HEALTH AND SAFETY MANAGEMENT	1	FA	\$35,000.00	\$35,000.00
31	RIPRAP (12-INCH)	35	CY		
32	RIPRAP (24-INCH)	65	CY		
33	GROUTED RIPRAP (18-INCH)	385	CY		
34	GROUTED BOULDER (24-INCH)	95	SY		
35	24-INCH GROUTED BOULDER EDGING	935	LF		
36	STORM WATER TREATMENT DEVICE	1	EA		
37	REINFORCED CONCRETE PIPE (12-INCH)	8	LF		
38	PEDESTRIAN HANDRAIL	306	LF		
39	MODULAR BLOCK WALL	1434	SF		
40	CONCRETE CLASS D (BRIDGE)	959	CY		
41	STRUCTURAL CONCRETE COATING	1830	SY		
42	REINFORCING STEEL (EPOXY COATED)	37617	LB		
43	REINFORCING STEEL	77837	LB		
44	36X11 FOOT CONCRETE 3-SIDED CULVERT (PRECAST)	1	LS		
45	DRILLED CAISSON (42-INCH)	598	LF		
46	1 1/2-INCH PLASTIC ELECTRICAL CONDUIT	160	LF		
47	GUARDRAIL TYPE 3	385	LF		
48	END ANCHORAGE TYPE 3D	4	EA		
49	72-INCH CHAIN-LINK FENCE (COMPLETE IN PLACE)	210	LF		
50	SIGN PANEL (CLASS 2)	21	SF		
51	STEEL TUBING SIGN POST (2-INCH X 2-INCH)	44	LF		
52	FIELD OFFICE	1	LS		
53	CONSTRUCTION SURVEYING	1	LS		
54	RIGHT-OF-WAY SURVEY MONUMENT	1	LS		
55	MOBILIZATION	1	LS		
56	PROPERTY RESTORATION	1	FA	\$15,000.00	\$15,000.00
57	EPOXY PAVEMENT MARKING	4	GAL		
58	WORK ZONE TRAFFIC CONTROL	1	LS		
59	PREFORMED THERMOPLASTIC PAVEMENT MARKING	140	SF		
60	VEHICLE TRACKING CONTROL	1	EA		
61	CONSTRUCTION FENCE	680	LF		
62	TEMPORARY SLOPE DRAIN	100	LF		
63	EROSION CONTROL BLANKET	3300	SY		
64	INLET PROTECTION (CURB SOCK)	10	LF		
65	ROCK SOCK/WATTLE	65	LF		
66	SEDIMENT CONTROL LOG	1420	LF		
67	STOCKPILE MANAGEMENT WITH PROTECTION	1	EA		
68	CONCRETE WASHOUT AREA	1	EA		

OFFER

BID SCHEDULE A

ITEM NO.	DESCRIPTION	EST QTY	UNIT	UNIT PRICE	EXTENSION
69	PERMANENT SEEDING	1	AC		
70	EROSION CONTROL SUPERVISOR	25	DAYS		
71	SANITARY SEWER PVC PIPE (8-INCH)	318	LF		
72	CONNECT TO EXISTING SANITARY MANHOLE	2	EA		
73	4-FOOT DIAMETER SANITARY MANHOLE	1	EA		
74	INSTALL CONTROLLED LOW-STRENGTH MATERIAL ENCASEMENT	6	CY		
75	12-INCH PVC WATERLINE (W/ RESTRAINED JOINTS)	142	LF		
76	12-INCH MJ SOLID SLEEVE	5	EA		
77	DISINFECTION SUPPORT	1	LS		
78	24-INCH STEEL WATERLINE (W/ WELDED JOINTS)	187	LF		
79	BUTT STRAP CONNECTION TO EXISTING 24-INCH STEEL WATERLINE	4	EA		
80	24-INCH DISHED BULKHEADS (TEMPORARY)	2	EA		
81	HYDROSTATIC TESTING	1	LS		
82	MINOR CONTRACT REVISIONS	1	FA	\$200,000.00	\$200,000.00
	TOTAL BASE BID	\$			

Total Base Bid Amount in Words: \$ _____

BID FORM
SIGNATURE PAGE

By signing in this space, the contractor hereby certifies that this company is not presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from bidding/proposing on any federal, state, county or municipal Invitations for Bids or Requests for Proposals.

 Signature

 Date

 Title

THE CONTRACTOR hereby Certifies that at the time of this certification, the Contractor does not knowingly employ or contract with an illegal alien and that the contractor has participated or attempted to participate in the basic pilot program in order to verify that the Contractor does not employ any illegal aliens. "Basic pilot program" means the basic pilot employment verification program created in Public Law 208, 104th Congress, as amended, and expanded in Public Law 156, 108th Congress, as amended, that is administered by the United States department of homeland security.

If awarded the contract, the undersigned hereby agrees to sign said Contract, and furnish the necessary bonds within ten (10) days of receipt of the "Notice of Award", of said contract, and to begin work within ten (10) days from the date of receipt of the "Notice to Proceed" and to complete the work within **7 months** from issuance of Notice to Proceed.

The undersigned acknowledges and understands the terms, conditions, Specifications and all Requirements contained and/or referenced and are legally authorized by the bidder to make the above bid statements or representations.

 (Name of Company)

 (Signature)

 (Date)

 (Address)

 (City, State and Zip)

 (Telephone Number)

 (Name typed/Printed)

 (Title)

 (e-mail address)

FEDERAL TAX ID # _____

This Company Is: Corporation____ Individual____ Partnership____ LLC____

Offeror hereby acknowledges receipt of the following amendments, if applicable (Offeror agrees that it is bound by all Amendments identified herein)

AMENDMENT #1_____ DATED:_____

AMENDMENT #2_____ DATED:_____

AMENDMENT #3_____ DATED:_____

AMENDMENT #4_____ DATED:_____

SCHEDULE B

INSTRUCTIONS TO BIDDERS

GENERAL INFORMATION

City Contracting no longer maintains a bidders' list. All projects subject to formal competition are posted on Rocky Mountain E Purchasing (www.rockymountainbidsystem.com) or in the lobby of our office at 30 S. Nevada Ave., Ste 201, Colorado Springs, CO 80903.

The City of Colorado Springs Contracting now utilizes **Rocky Mountain E Purchasing** which can be accessed [here](#). This system will provide you with convenient access to all bid information for the City of Colorado Springs as well as 106 other local agencies throughout Colorado. To receive email alerts of open bids in your field please register with Rocky Mountain E Purchasing System and complete your online registration. All vendors are encouraged to register in order to access RFP's, IFB's, addenda, and awards.

B.1 BID ISSUE DATE

Invitation for Bid (IFB) Number B16-T026 NS is being issued and posted on February 3, 2016.

B.2 SUBMISSION OF BIDS

B.2.1 Bids are to be submitted in a sealed envelope to City Contracting Office, 30 S. Nevada Ave., Suite 201, Colorado Springs CO. 80903.

B.2.2 Date/Time: Bids shall be received on or before: **2:00 P.M., March 1, 2016.**

B.2.3 Non-refundable Fee for Bidding Documents: **None Required**

B.2.4 Bid Bond is required if total bid exceeds \$100,000.00. (Also see B.12 and B.22)

*******LATE BIDS WILL NOT BE ACCEPTED*******

B.3 PRE-BID CONFERENCE

A pre-bid conference is scheduled for **1:00 P.M., Friday, February 12, 2016**, at the City Administration Building, Suite 401, Large Conference Room, 30 South Nevada, Suite 401, Colorado Springs, CO. 80903. Please note, all visitors to City facilities may be required to present a picture I.D. prior to entry to the building.

B.3.1 This pre-bid conference is **p**; however, contractors, suppliers, and vendors are strongly urged to attend in order to voice their comments, concerns and/or questions.

B.4 LATE BIDS/LATE MODIFICATIONS OF BIDS

B.4.1 Bids received in the office designated in B.2 above, after the exact time set for opening are considered "late bids", and will not be accepted by the Bid Opening Official. Bidders are solely responsible for insuring their bids arrive on time and to the place of bids specified in the Invitation for Bid.

B.4.2 The City of Colorado Springs will not consider a late bid or late modification of bid unless:

- (1) There is conclusive evidence that the bid was submitted to the office designated in B.2 above, on time and was mishandled by the City of Colorado Springs (i.e. lost or misplaced) City Contracting personnel responsible for handling/receiving bids. Mishandling by other units or offices of the City of Colorado Springs does not constitute City Contracting personnel.
- (2) Or – it was the only bid received.

B.5 MISTAKES IN BIDS - CONFIRMATION OF BID

When it appears from a review of the bid that a mistake has been made, the bidder may be requested to confirm their bid. Situations in which the confirmation may be requested include obvious, apparent errors on the face of the bid or a bid unreasonably lower than the other bids

submitted. All mistakes in bids will be handled in accordance with the City of Colorado Springs Procurement Rules and Regulations.

B.6 PROCUREMENT RULES AND REGULATIONS

All formal Invitation for Bids (IFB) advertised by the City of Colorado Springs is solicited in accordance with the City's Procurement Rules and Regulations. The City's Procurement Rules and Regulations can be reviewed and/or downloaded from the City Contracting web-site www.coloradosprings.gov/contracting. Any discrepancies or conflicting statements, decisions regarding bidding irregularities, clauses or specifications will be rectified utilizing the City's Procurement Rules and Regulations. It is the bidder's responsibility to advise the Contracting Specialist listed in these bidding documents of any potential discrepancies, conflicting statements, clauses or specifications prior to the bid opening date and time.

B.7 MINOR INFORMALITIES/IRREGULARITIES IN BIDS

B.7.1 A minor informality or irregularity is one that is merely a matter of form and not of substance. It also pertains to some immaterial defect in a bid or variation of a bid from the exact requirements of the invitation that can be corrected or waived without being prejudicial to other bidders. The defect or variation is considered immaterial when the effect on price, quantity, quality, or delivery is negligible when contrasted with the total cost or scope of the services being acquired.

B.7.2 If the City Procurement Services determines that the bid submitted contains a minor informality or irregularity, then the Procurement Manager shall give the bidder an opportunity to cure any deficiency resulting from a minor informality or irregularity in a bid, or waive the deficiency, whichever is to the advantage of the City. In no event will the bidder be allowed to change the bid amount. Examples of minor informalities or irregularities include but are not limited to the following;

B.7.2.1 Bidder fails to sign the Bid, but only if the unsigned bid is accompanied by other material evidence, which indicates the bidder's intention to be bound by the unsigned bid. (such as Bid bond, or signed cover letter which references the bid # and amount of bid).

B.7.2.2 Bidder fails to acknowledge an Amendment - this may be considered a minor informality only if the Amendment, which was not acknowledged, involves only a matter of form or has either no effect or merely a negligible effect on price, quantity, quality, or delivery of the item or services bid upon.

B.8 REJECTION OF BIDS

Any bid that fails to conform to the essential requirements of the invitation for bids will be rejected.

B.8.1 Any bid that does not conform to the applicable specifications shall be rejected unless the invitation authorizes the submission of alternate bids and the items or services offered as alternates meet the requirements specified in the invitation for bids.

B.8.2 A bid shall be rejected when the bidder imposes conditions that would modify requirements of the invitation or limit the bidder's liability to the City, since to allow the bidder to impose such conditions would be prejudicial to other bidders. For example, bids shall be rejected in which the bidder:

B.8.2.1 Protects against future changes in conditions, such as increased costs, if total possible costs to the City cannot be determined.

B.8.2.2 Fails to state a price and indicates that price shall be "price in effect at time delivery".

B.8.2.3 States a price but qualifies it as being subject to "price in effect at time of delivery".

B.8.2.4 Takes exceptions to the invitation for bids terms and conditions.

B.8.2.5 Inserts the bidder's terms and conditions.

B.8.2.6 Limits the rights of the City under any contract/invitation for bid clause.

B.9 ESTIMATED QUANTITIES

If the Bid schedule herein contains estimated quantities this provision is applicable. The quantities listed for each of the items in the bid schedule are only estimated quantities. Contractors are required to bid a firm Unit cost for each item specified. The actual quantities ordered may fluctuate up or down. The unit prices proposed by each bidder will remain firm and will not be re-negotiated if the estimated quantities are not met or are exceeded. This clause will take precedence over any/all other estimated quantity clauses that conflict with this clause.

For bidding purposes, if there is a conflict between the extended total of an item and the Unit Price, the Unit price shall prevail and be considered as the amount of the bid. All Unit prices shall include all necessary overhead and profit. Items not listed in the bid schedule such as overhead, profit, mobilization, de-mobilization, bonding, etc. shall be distributed throughout the bidder's Unit Prices for the items listed in the bid schedule.

B.10 NUMBER OF COPIES

Bidder shall submit in its sealed and marked envelope, one (1) copy of its bid, signed in ink, and, if applicable, one (1) original copy of the Bid Bond as defined in B.12 and B.22.

B.11 IDENTIFICATION OF BID

Bids must be returned in a sealed envelope; solicitation number and date for submission of offers must be clearly marked on the outside in the lower left hand corner:

Bid No. B16-T026 NS N Chestnut St over S. Douglas Creek

Due Date & Time: March 1, 2016, 2:00 P.M.

Company: _____

Any offer that is submitted without being properly marked may be opened for identification prior to the deadline for receipt of offers and then resealed.

B.12 BID BOND REQUIREMENTS

A bid bond in the amount of five (5) percent of the bid amount is required to be submitted with your bid when (1) the total amount of your accumulative bid is more than \$100,000 or (2) is required elsewhere in this solicitation. This Bond must meet the conditions specified under Bond Requirements B.22 and shall be submitted using the form in Section E of this solicitation, or by submitting a cashier's check or certified check.

B.13 SALES TAX

The contractor shall apply with the Colorado Department of Revenue for a tax-exempt certificate for this project. The certificate does not apply to City of Colorado Springs Sales and Use Tax (3.12%) which shall be applicable and included in your bid or proposal in all cases. The tax exempt project number and the exemption certificate only applies to County, PPRTA (Pikes Peak Rural Transportation Authority), and State taxes when purchasing construction and building materials **to be incorporated in this project.**

Furthermore, the exemption **does not** include or apply to the purchase or rental of equipment, supplies or materials that **do not become a part of the completed project or structure.** In these instances, the purchase or rental is subject to full taxation of 8.25% (City-3.12%, County-1.23%, PPRTA-1%, and State-2.9%).

The Contractor and all subcontractors shall include in their bid City of Colorado Springs Sales and Use Tax (3.12%) on the work covered by the Contract, and other taxes as applicable.

Note: For all equipment, materials and supplies incorporated into the work purchased from vendors or suppliers not licensed to collect City Sales Tax (i.e. out of state suppliers, etc), City Use Tax (3.12%) is due and payable to the City. The contractor shall execute and deliver, and shall cause the Contractor's subcontractors to execute and deliver to the City Sales Tax Office, ST 16 forms listing all said equipment, materials and supplies and the corresponding use tax due, along with payment for said taxes unless already included in the bid price. Any

outstanding taxes due may be withheld from the final payment due the contractor and may result in suspension from bidding on City projects.

Forms and instructions can be downloaded at Coloradosprings.gov, search "Sales Tax Applications and Forms") Questions can be directed to the City Sales Tax Division at (719) 385-5903.

Our Registration Numbers are as follows:

City of Colorado Springs

Federal I.D.: 84-6000574

Federal Excise: A-138557

State Sales Tax: 98-03479

B.14 PREPARATION OF BID OFFER

- B.14.1 Bidders are expected to examine the drawings, specifications, bid documents, proposed contract forms, terms and conditions, and all other instructions and solicitation documents. Bidders are expected to visit the job-site to determine all requirements and conditions that will affect the work. Failure to do so will not relieve a bidder from their responsibility to know what is contained in this invitation for bid, or site conditions affecting the work. In addition,
- B.14.2 The bidder certifies that it has checked all of its figures, and understands that the Owner will not be responsible for any errors or omissions on the part of the bidders in preparing its bid.
- B.14.3 All items, (unless the invitation specifically states otherwise) including any additive or deductive alternates on the bid schedule, **must** be completely filled out or the bid will be determined non-responsive and ineligible for consideration for award.
- B.14.4 The bidder declares that the person or persons signing this bid is/are authorized to sign on behalf of the firm listed and to fully bind the bidder to all the requirements of the solicitation.
- B.14.5 The bidder certifies that no person or firm other than the bidder or as otherwise indicated as any interest whatsoever in this bid/offer or the Contract that may be entered into as a result of this bid/offer and that in all respects the offer is legal and firm, submitted in good faith without collusion or fraud.
- B.14.6 By submitting a bid the bidder certifies that it has complied and will comply with all requirements of local, state, and federal laws, and that no legal requirements have been or will be violated in making or accepting this bid. Bidders are expected to review the City's Procurement Rules and Regulations (See B.6) which will be used when determining a bidder responsive and responsible and awarding contracts in the best interest of the City.
- B.14.7 If there is a discrepancy between the unit price and the total price, the unit price shall be used to determine the applicable total price. Bidders are responsible for including profit and overhead associated with the project when determining their unit prices.

B.15 BASIS OF AWARD

The City of Colorado Springs intends to award a contract resulting from this solicitation to the lowest, responsive, responsible bidder, whose offer conforming to the solicitation, will be most advantageous to and in the best interest of the City of Colorado Springs, cost or price and other factors considered.

- B.15.1 In addition to other factors, bid/offers will be evaluated on the basis of advantages and disadvantages to the City that might result from offers received.
- B.15.2 The City reserves the right to reject any or all proposals and to waive informalities and/or irregularities in the bid offer.
- B.15.3 Total bid will be evaluated and awarded as follows: It is the City's intent to award this bid based on the **TOTAL BID FOR ALL ITEMS, split awards will not be made.**

B.16 PERIOD OF ACCEPTANCE

The bidder agrees that its bid offer shall remain open for acceptance by the City for a period of sixty (60) calendar days from the date specified in the solicitation for receipt of bids.

B.17 CONTRACT AWARD

The signature of the bidder indicates that within ten (10) calendar days from acceptance of its bid offer it will execute a contract with the City of Colorado Springs and if indicated in this solicitation, furnish a project specific Certificate of Insurance naming the City of Colorado Springs as Additional Insured, furnish Performance, Labor and Materials, Payment and Maintenance Bonds and any other documents required by the Specifications or Contract Documents.

B.18 NOTICE TO PROCEED

Work may not start under any awarded contract until a written notice to proceed is issued by the City of Colorado Springs. The City of Colorado Springs may issue the Notice to Proceed anytime after the contract is signed and, if required, insurance and bonds have been provided in accordance with B.22 below.

B.19 AMENDMENTS TO THE SOLICITATION

Amendments are also referred to as addendum or addenda; and these terms shall be considered synonymous. The City of Colorado Springs will post all addenda on the City's web-site www.rockymountainbidsystem.com. It is the bidder's responsibility to check the web-site for posted addenda or contact the Contracting Specialist listed in B.21 below to confirm the number of Amendments which have been issued.

B.19.1 If this solicitation is amended, then all specifications, terms and conditions, which are not amended, remain unchanged.

B.19.2 Bidders shall acknowledge receipt of any amendment to this solicitation (1) by signing and returning the amendment, (2) by identifying the amendment number and date in the space provided for this purpose on the form for submitting a bid offers, or (3) by letter or facsimile.

B.19.3 Acknowledged amendments must be received prior to bid opening. Bidders are encouraged to include signed addenda or initialed acknowledgment with returned bids.

B.20 EXPLANATIONS TO PROSPECTIVE OFFERORS

Any prospective bidder desiring an explanation or interpretation of the solicitation documents, drawings, specifications, etc., must request it in writing soon enough to allow a reply to reach all prospective offerors before the time for submission of offers. Oral explanations or instructions given before the opening of bids will not be binding. Any information provided to a prospective bidder during the bid preparation stage will be promptly furnished to all other prospective bidders as an amendment to the solicitation if that information is necessary in submitting bid offers or if the lack of it would be prejudicial to other prospective bidders. Also see the City's Procurement Rules and Regulations (See B.6).

B.21 QUESTIONS AND OTHER REQUESTS FOR INFORMATION

All questions shall be submitted in writing to the following specified individual. The preferred method of submitting written questions is via e-mail. All questions must be received before the close of business day Friday, February 19, 2016 10:00 AM.

All questions shall be directed to:

Nicole Spindler (719) 385-5265 nspindler@springsgov.com

B.22 BOND REQUIREMENTS

B.22.1 Bid (offer) Bond

a) The Bidder is required to furnish with their bid a bid bond in the form of a certified

check, cashier's check or surety bid bond acceptable to the Contracting Specialist in the sum equal to at least 5% of the total amount of the bid payable without condition to the City of Colorado Springs if; (1) the total amount of your accumulative bid is more than \$100,000 or (2) is required elsewhere in this solicitation.

- b) The Bid Bond shall guarantee that the bid will not be withdrawn or modified for a period of sixty calendar days after the time set for the receipt of bid offers, and if accepted within those sixty calendar days, that the person, firm or corporation submitting same shall within ten (10) calendar days after being notified of the acceptance of its bid offer, enter into a Contract and furnish the required bonds and all insurance certificates called for under this invitation for bid.
- c) The Bid Bonds of unsuccessful bidders will not be returned to the respective bidders unless a self addressed stamped envelope is provided along with a written request for bid bond return. However, if a certified check or a cashier's check is submitted in lieu of the Bid Bond, it will be returned as soon as possible after the lowest responsive and responsible bidder is determined and a contract is executed.
- d) In the event the bidder whose bid offer is accepted fails to enter into the contract and/or furnish the proper bonds, its certified check, cashier's check or surety bid bond will be forfeited in full to the City.

B.22.2 Performance, Labor and Materials Payment, and Maintenance Bonds

The Contractor shall furnish to the City of Colorado Springs one copy of each; Performance Bond, Labor and Materials Payment Bond, and a Maintenance Bond in the amount of 100% of the total contract within ten (10) calendar days after notification of award of a contract. The cost of all bonds shall be included in Contractor's bid offer.

B.22.2.1 Bonds shall:

- a) Be for the full amount of the contract price.
- b) Guarantee the Contractor's faithful performance of the work under this contract, and the prompt and full payment for all labor and materials involved therein.
- c) Guarantee protection to the City of Colorado Springs against liens of any kind.
- d) Be, when a surety bond is furnished, from a surety company operating lawfully in the state of Colorado and shall be accompanied with an acceptable "Power-of-Attorney" form attached to each bond copy.
- e) Be issued from a surety company that is acceptable to the City of Colorado Springs.
- f) Be submitted using the forms in the Exhibit section of this solicitation.

B.23 SPECIFICATIONS AND DRAWINGS

B.23.1 No Fee solicitations: All interested bidders may obtain one copy of the Project Specifications and a set of the project drawings for use in preparing your bids. If the bidder requires additional sets, it is their responsibility to duplicate at their own expense additional copies.

B.23.2 Upon award of the contract, the City will be responsible for furnishing the selected contractor a minimum of three (3) sets of both the specifications and drawings. The City will also provide any returned sets that may be available. However, in no event shall the City be required to pay for the reproduction of more than 3 sets of each.

B.23.3 Specifications are included in this solicitation. See **Sections F, G & H.**

B.24 TYPE OF CONTRACT

It is the intent of this Invitation for Bids (IFB) to award a firm fixed unit price Contract based on the prices offered by the lowest responsive and responsible bidder. Contract prices shall remain firm and fixed throughout the contract performance period.

B.25 F.O.B. DESTINATION

Unless otherwise specified in the invitation for bid, all goods, materials, supplies, equipment or services covered by this solicitation shall be delivered F.O.B. destination, all freight charges prepaid and allowed, within the city limits of the City of Colorado Springs, Colorado, at the location indicated in the awarded contract or purchase order.

B.26 BID RESULTS

The City of Colorado Springs does not mail bid results or tabulations. However, bid tabulations are posted and can be downloaded from the website www.rockymountainbidsystem.com. Bid tabulations will also be faxed or emailed upon request. To request a bid tab, email contracting@springsgov.com.

B.27 TERMS, CONDITIONS AND SPECIAL PROVISIONS

Bidders are advised to pay special attention to Schedules C, Terms and Conditions, and Schedule D, Special Provisions. These schedules may contain requirements that will have an impact on all potential bidders, such as Liquidated Damages, Indemnification, DBE participation, type of contract, and delivery schedule.

B.28 FISCAL OBLIGATION OF CITY

This Agreement is expressly made subject to the limitations of the Colorado Constitution and Section 7-60 of the Charter of the City of Colorado Springs. Nothing herein shall constitute, nor be deemed to constitute, the creation of a debt or multi-year fiscal obligation or an obligation of future appropriations by the City Council of Colorado Springs, contrary to Article X, § 20, Colo. Const., or any other constitutional, statutory, or charter debt limitation. Notwithstanding any other provision of this Agreement, with respect to any financial obligation of the City which may arise under this Agreement in any fiscal year after the year of execution, in the event the budget or other means of appropriation for any such year fails to provide funds in sufficient amounts to discharge such obligation, such failure (i) shall act to terminate this Agreement at such time as the then-existing and available appropriations are depleted, and (ii) neither such failure nor termination shall constitute a default or breach of this Agreement, including any sub-agreement, attachment, schedule, or exhibit thereto, by the City. As used herein, the term "appropriation" shall mean and include the due adoption of an appropriation ordinance and budget and the approval of a Budget Detail Report (Resource Allocations) which contains an allocation of sufficient funds for the performance of fiscal obligations arising under this Agreement.

B.29 EQUAL EMPLOYMENT OPPORTUNITY

- B.29.1 In connection with this procurement, the contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age, marital status or disability. The contractor will take affirmative action to ensure that all applicants are employed and that employees are treated during employment without regard to their race, color, religion, sex, national origin, age, marital status or disability. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.
- a) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor; state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, age, or national origin.

- b) The Contractor will comply with all equal employment opportunity provisions, rules, regulations and executive orders issued by the City of Colorado Springs, State of Colorado and the Secretary of Labor.
- c) The Contractor will furnish all information and reports required by any equal employment opportunity provisions, rules, regulations and executive orders and will permit access to its books, records, and accounts for purposes of investigation to ascertain compliance with such Rules, Regulations, and Orders.
- d) In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such Rules, Regulations, or Orders, this contract may be canceled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further City contracts.

B.30 PERIOD OF PERFORMANCE

The contractor shall complete all work within 7 months after the Notice-to-Proceed as per the Specifications and Drawings. The contractor will start work promptly after receipt of the Notice-to-Proceed and continue to work diligently until all work is completed and accepted by the City.

B.31 EMPLOYMENT OF ILLEGAL ALIENS

Illegal Aliens - Public Contracts for Services - Compliance with Title 8, Article 17.5, Colorado Revised Statutes:

The Contractor acknowledges, understands, agrees, and certifies that: In the performance of any work or the provision of any services by the Contractor under this Contract, the Contractor shall not knowingly employ or contract with an illegal alien to perform work under this contract; or Enter into a contract with any subcontractor that fails to certify to the contractor that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this Contract or under the subcontract to this contract. In The Contractor certifies in accord with Section 8-17.5-102(1) C.R.S. that, on the date the Contractor signs this contract, the Contractor does not knowingly employ or contract with an illegal alien who will perform work under this contract and that the Contractor shall participate in the e-verify program or Colorado Department of Labor and Employment program in order to confirm the employment eligibility of all employees who are newly hired for employment or to perform work under this contract. The contractor is expressly prohibited from using basic pilot program procedures to undertake pre-employment screening of job applicants while this Contract and any services under this Contract is being performed. If the contractor obtains actual knowledge that a subcontractor performing work under the public contract for services knowingly employs or contracts with an illegal alien, the Contractor shall notify the subcontractor and the City within three days that the contractor has actual knowledge that the subcontractor is employing or contracting with an illegal alien, and terminate the subcontract with the subcontractor if within three days of receiving the notice the subcontractor does not stop employing or contracting with the illegal alien; except that the contractor shall not terminate the contract with the subcontractor if during the three days the subcontractor provides information to establish that the subcontractor has not knowingly employed or contracted with an illegal alien. The Contractor shall comply with any request by the City, federal government, or the Colorado Department of Labor and Employment made in the course of an investigation that the department, pursuant to the authority established in Section 8-17.5-102 C.R.S., or a City or federal investigation. If the contractor violates or fails to comply with any provision of C.R.S. 8-17-101 et seq, the City may terminate this Contract for breach of contract. If this contract is so terminated, the Contractor shall be liable for any actual and consequential damages to the City.

B.32 FORCE MAJEURE

In the event of either party being rendered unable wholly, or in part, by force majeure to carry out its obligations under this Agreement, then on such party's giving notice and full particulars of such force majeure in writing to the other party as soon as possible after the occurrence of the cause relied on, the obligation of the party giving such notice, so far as it is affected by force majeure, shall be suspended during the continuance of any inability so caused, but for no longer period, and such cause shall, as far as possible, be remedied with all reasonable dispatch. The

term “force majeure” as employed herein shall mean acts of the public enemies, wars, blockages, insurrections, landslides, earthquakes, fires, and floods

B.33 BID DOCUMENTS

The following listed documents must be submitted with your bid in order for your bid submittal to be considered responsive. Use this list as a checklist to make sure all required documents are submitted.

Schedule A., Bid Form

Exhibit 3 Bid Bond

Exhibit 7 Minimum Insurance Requirements

Exhibit 8 Representations and Certifications

Acknowledged Addendums if issued

SCHEDULE C**C.0 TERMS & CONDITIONS**

The Standard Specifications for this project shall be the "CITY OF COLORADO SPRINGS ENGINEERING DIVISIONS SPECIAL PROVISIONS revised October 2003, included herein and the City's STANDARD SPECIFICATIONS", Major Revisions February, 1995 except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety. The following terms and conditions are listed because of their importance to bidders during the solicitation phase. The City of Colorado Springs Engineering Divisions Standards contains all of the Terms and Conditions that are applicable. It is the responsibility of each bidder/contractor to insure they have a copy of the above mentioned special provisions/standard specifications and understands the requirements therein. Copies are available for purchase at the cost of \$25.00 from the City of Colorado Springs, Office Services Unit, Suite L01, 30 South Nevada, Colorado Springs, during regular business hours. These special provisions/standard specifications are also available and may also be downloaded from the City's web-site at www.springsgov.com/contracting, or www.springsgov.com/cityengineering.

C.1. CONFIDENTIAL MATTERS

All data and information gathered by the Contractor and its subcontractors, and all reports, recommendations, drawings, documents, and data shall be treated by the Contractor and its subcontractors as confidential. The Contractor and its subcontractors must agree not to communicate and disclose the aforesaid matters to a third party or use them in advertising, publicity, or propaganda and/or in another job or jobs, unless prior written consent is obtained from the PPRTA or the City.

C.2. INDEMNIFICATION

The Contractor agrees to indemnify and hold harmless the PPRTA and the City, its employees, directors or agents, from and against all claims, damages, losses, and expenses, including attorney's fees arising from deaths or accidents or destruction of tangible property (other than the work itself), including the loss of use resulting there from, resulting to employees of the Contractor, or its subcontractors, in the work contemplated and done under the Contract, and to indemnify and hold harmless City, its employees, directors, or agents, from and against all claims, damages, losses, and expenses, including attorney's fees, decrees or judgments whatsoever arising from any and all injuries, including death or damages or destruction of property resulting to any third person or persons, corporation, partnerships or associations caused by any act, omission, failure, or neglect of the Contractor, its subcontractors, or agents, servants and employees, or other persons under its supervision or direction in the performance of any work under the terms of the Contract. This indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable for or by the Contractor or any subcontractor, manufacturer, or supplier under the Workmen's Compensation Act, disability benefit acts, or other employee benefit acts.

C.3. NON-APPROPRIATION OF FUNDS

This Agreement and the financial commitments contained herein are subject to appropriation by PPRTA Board for the City of Colorado Springs. In the event that funds are not appropriated for the items, services, or continuations thereof provided hereunder, during the term of this Agreement, the City shall not be obligated to pay any portion of payments remaining unpaid. City for the PPRTA agrees to notify Contractor of such non-appropriation at the earliest possible time. No penalty shall accrue to City or the PPRTA in the event of such non-appropriation.

The funds appropriated for this Contract are equal to or exceed the Contract amounts for work to be completed in the fiscal year in which this Contract is awarded. For work to be completed in subsequent fiscal years, if any, the City for the PPRTA will notify the Contractor of the amount of appropriation for such work after the adoption of the PPRTA's Appropriation for such years.

C.4. LAW

This contract is subject to and shall be interpreted under the law of the State of Colorado, and the charter, City Code, Ordinances, Rules and Regulations of the City of Colorado Springs, a home rule city. Court venue and jurisdiction shall exclusively be in the Colorado District Court of El Paso County Colorado. The contractor shall insure that the contractor and the contractor's

employees, agents and officers are familiar with, and comply with, applicable Federal, State and Local laws and Regulations as now written or hereafter amended.

C.5. BOOKS OF ACCOUNT AND AUDITING

The Contractor shall make available to the City for the PPRTA if requested, true and complete records, which support billing statements, reports, performance indices, and all other related documentation. The City's or PPRTA's authorized representatives shall have access during reasonable hours to all records, which are deemed appropriate to auditing billing statements, reports, performance indices, and all other related documentation. The Contractor agrees that it will keep and preserve for at least seven years all documents related to the Contract which are routinely prepared, collected or compiled by the Contractor during the performance of this contract.

The City's Auditor or the PPRTA's authorized representatives shall have the right at any time to audit all of the related documentation. The Contractor shall make all documentation available for examination at the Auditor's request at either the Auditor or Contractor's offices and without expense to the City.

C.6 PPRTA FUNDED PROJECTS

PPRTA Funding Special Provision: Joint Contracts - City of Colorado Springs and the Pikes Peak Rural Transportation Authority (PPRTA).

This contract is a joint contract between the Contractor, the City of Colorado Springs, and the Pikes Peak Rural Transportation Authority. The Parties therefore agree to the following:

1. This PPRTA Funding Special Provision shall supersede any contrary provision of this Contract.
2. The Contractor acknowledges and understands that this contract is funded in whole or in part by the PPRTA and administered by the City. Both the City and the PPRTA are Parties to this Contract.
3. The Contractor acknowledges and understands that all payments under this contract shall be made to the contractor by the PPRTA. PPRTA funding obligations shall be paid by PPRTA warrants. In the event there is Joint City/PPRTA funding, then payment to the Contractor by the PPRTA shall consist of Warrants from the City and Warrants from the PPRTA. The Contractor agrees to accept all payments made or proffered by the PPRTA under this Contract.
4. All bonds under this Contract shall include the City of Colorado Springs and the PPRTA as Obligees.
5. All insurance policies provided by the Contractor pursuant to this contract except Workers Compensation Insurance shall name both the City of Colorado Springs and the PPRTA as additional insureds. All insurance policies provided by any sub-contractor for any work pursuant to contracts with the Contractor, except Workers Compensation Insurance, shall also name both the City of Colorado Springs and the PPRTA as additional insureds.
6. Law: This contract is subject to and shall be interpreted under the law of the State of Colorado, and the Charter, City Code, Ordinances, Rules and Regulations of the City of Colorado Springs, Colorado, a Home Rule City and the Resolutions, Rules and Regulations of the PPRTA. Court venue and jurisdiction shall exclusively be in the Colorado District Court for El Paso County, Colorado. The Parties agree that this contract shall be deemed to have been made in, and the place of performance is deemed to be in, the City of Colorado Springs, El Paso County, State of Colorado. The Contractor shall insure that the Contractor and the Contractor's employees, agents,

officers and subcontractors are familiar with, and comply with, applicable Federal, State, and Local laws and regulations as now written or hereafter amended.

7. Appropriation and availability of funds: In accord with the Colorado Constitution, Article X, Section 20, and the City Charter, performance of the City's obligations under this Contract is expressly subject to appropriation of funds by the City Council for this contract and the availability of those appropriated funds for expenditure. Further, in the event that funds are not appropriated in whole or in part sufficient for performance of the City's obligations under this Contract, or appropriated funds may not be expended due to Constitutional or City Charter spending limitations, then the City and the PPRTA may terminate this Agreement without compensation to the Contractor. Performance of the PPRTA's obligations under this IGA is expressly subject to appropriation of funds by the PPRTA and the availability of those funds for the payment of obligations incurred under this contract. Further, in the event that PPRTA funds are not appropriated in whole or in part sufficient for performance of the PPRTA's obligations under this Contract, or appropriated funds may not be expended legal limitations on non-availability, then the City and the PPRTA may terminate this Contract without compensation to the Contractor.
8. Indemnification: The Contractor agrees that the Contractor shall indemnify, defend and hold harmless the City, its officers, employees and agents, and the PPRTA, its officers, employees and agents, from and against any and all loss, damage, injuries, claims, cause or causes of action, or any liability whatsoever resulting from, or arising out of, or in connection with the Contractor's obligations or actions under this Contract.
9. Warranties: All warranties provided by Contractor under or pursuant to this Contract to the City shall also apply to the PPRTA.
10. Final Payment: Final payment under this Contract shall be made in accord with the terms of this Contract, except that final payment shall be made by the PPRTA, and the making and acceptance of final payment shall constitute a waiver of all claims by the Contractor against the City and the PPRTA.
11. Termination or default of Contract: In all contract provisions giving the City the right to terminate, for convenience or otherwise, or giving the City rights in the event of default by the contractor, the term City shall include the PPRTA.
12. Change Orders:
 - a) The Contractor agrees and acknowledges as a part of this Contract that no change order or other form or order or directive may be issued by the City which requires additional compensable work to be performed, which work causes the aggregate amount payable under this Contract to exceed the amount appropriated for this Contract, unless the Contractor has been given a written assurance by the City that lawful appropriations to cover the costs of the additional work have been made or unless such work is covered under a remedy-granting provision of this Contract.
 - b) The Contractor further agrees and acknowledges as a part of this Contract that no change order or other form or order or directive which requires additional compensable work to be performed under this Contract shall be issued by the City unless City or PPRTA funds are available to pay such additional costs, and, regardless of any remedy-granting provision included within this Contract, the Contractor shall not be entitled to any additional compensation for any additional compensable work performed under this Contract, including but not limited to emergency work, and expressly waives any rights to additional compensation, whether by law or equity, unless, prior to commencing the additional work, the Contractor was given a written change order describing the

additional compensable work to be performed, and setting forth the amount of compensation to be paid, which change order was signed by the authorized City representative. It is the Contractor's sole responsibility to know, determine, and ascertain the authority of the City representative signing any change order under this Contract.

- c) Any budget changes or significant changes to the design, requirements or scope of the Contract shall require the approval of the City and the PPRTA.

C.7 GRATUITIES

- 1) The right of the Contractor to proceed or otherwise perform this Contract, and this Contract may be terminated if the Mayor and/or his designee, and/or the City Contracting Manager determine, in their sole discretion, that the Contractor or any officer, employee, agent, or other representative whatsoever, of the Contractor offered or gave a gift or hospitality to a City officer, employee, agent or contractor for the purpose of influencing any decision to grant a City Contract or to obtain favorable treatment under any City Contract.
- 2) The terms "hospitality" and "gift" include, but are not limited to, any payment, subscription, advance, forbearance, acceptance, rendering or deposit of money, services, or any thing of value given or offered, including but not limited to food, lodging, transportation, recreation or entertainment, token or award.
- 3) Contract termination under this provision shall constitute an breach of contract by the Contractor, and the Contractor shall be liable to the city for all costs of reletting the contract or completion of the contract. Further, if the Contractor is terminated under this provision, or violates this provision but is not terminated, the Contractor shall be subject to debarment under the City's Procurement Regulations. The rights and remedies of the City provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract."

SCHEDULE D**D.0 SPECIAL PROVISIONS (IF APPLICABLE)**

The Standard Specifications for this project shall be the "CITY OF COLORADO SPRINGS ENGINEERING DIVISIONS SPECIAL PROVISIONS revised October 2003, included herein and the City's STANDARD SPECIFICATIONS", Major Revisions February, 1995 except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety. The following terms and conditions are listed because of their importance to bidders during the solicitation phase. The City of Colorado Springs Engineering Divisions Standards contains all of the Terms and Conditions that are applicable. It is the responsibility of each bidder/contractor to insure they have a copy of the above mentioned special provisions/standard specifications and understand the requirements therein. Copies are available for purchase at the cost of \$25.00 from the City of Colorado Springs, Office Services Unit, Suite L01, 30 South Nevada, Colorado Springs, during regular business hours. These special provisions/standard specifications are also available and may also be downloaded from the City's web-site at www.coloradosprings.gov/contracting, or www.coloradosprings.gov/cityengineering.

D.1 GENERAL PROVISIONS

All bids submitted as a result of City of Colorado Springs Invitations for Bids (IFB) shall be in accordance with the latest version of the City's Procurement Rules, Regulations and Information. The latest version is posted on the City's web-site at www.coloradosprings.gov/contracting, and can be reviewed or downloaded.

D.2 DEFINITIONS AND TERMS

Also see Procurement Rules 1-103 Terms Defined

City	City of Colorado Springs, Colorado.
Contract Documents	Contract Documents shall consist of Advertisement for Bids, Instructions to Bidders, Form of Bid or Proposal, Addenda, the signed Agreement, surety bonds, insurance documents, the General and Special Provisions of the Contract, the Plans, the Specifications, the Drawings, including all modifications thereof incorporated in any of the documents before execution of the agreement. The term Plans shall include the term Drawings unless otherwise specified.
Contractor	The person, persons, firm, or corporation to whom a contract is awarded by the City and who is subject to the terms of said contract. Contractor shall include the agents, employees, workmen, Contractors and any assignees of said contract.
Due Date and Time	The scheduled date and time for the receipt of bids, and opening thereof.
Engineer	The City Engineer of Colorado Springs or, designated representative.
Project Engineer/Manager	The individual representing the City of Colorado Springs responsible for Managing and oversight of the Contract.
Notice	Any written notice served pursuant to the terms of the contract. Notice shall be deemed to have been duly served if delivered in person or by registered mail to: <u>Pre-award</u> The Procurement Specialist listed in the Invitation for Bid, City of Colorado Springs, Procurement and Contracts, 30 South Nevada Ave., Room 201, Colorado Springs, CO 80903.

Post award

The Project Manager listed in the Invitation for Bid, City of Colorado Springs, City Engineering, 30 South Nevada Ave., Room 403, Colorado Springs, CO 80903.

Notice to the Contractor will be to the Chief representative of the Contractor at the site of the project in person; or by registered mail to the place stated in the papers prepared by the Contractor to accompany their proposal as the address of their permanent place of business; or as to the Surety on the performance bond by registered mail to the Surety at the home office of such surety.

Project

The entire improvement proposed by the City to be construed in whole or in part pursuant to the contract.

Proposal Form or

A contract document prepared by the City upon which the bidder shall submit their bid.

Subcontractor

A person, firm, or corporation, other than the Contractor, supplying labor or materials, or both, or equipment furnished at the site of the project under an Agreement with the Contractor.

Surety

The person, firm, or corporation that has executed as surety the Contractor's Bid, Performance, Payment and Maintenance Bonds.

Calendar Day

Each and every day shown on the calendar, beginning and ending at midnight.

SECTION 100

PROSPECTIVE BIDDERS

100.01 PROCUREMENT RULES AND REGULATIONS

All formal Invitation for Bids (IFB) and/or Request for Proposals (RFP) advertised by the City of Colorado Springs are solicited in accordance with the City's Procurement Rules and Regulations. The City's Procurement Rules and Regulations can be reviewed and/or downloaded from the City Contracts web-site (see 100.01).

100.02 ADVERTISEMENT FOR BIDS

All bids estimated to exceed \$50,000.00 will be formally advertised under normal conditions. Formal bids will be advertised at least one time as a legal notice in the Colorado Springs Gazette Telegraph, and posted on the City's web-site at www.springsgov.com/Contracting.

100.03 INVITATION FOR BIDS - CONTENT

The Invitation for Bids shall include the following: (a) Instructions and information to bidders concerning the bid submission requirements, including the time and closing date, the address of the office to which bids are to be delivered; (b) The project description, basis of award, delivery or performance schedule and inspection and acceptance requirements; (c) The contract terms and conditions, including warranty and bonding or security requirements as applicable.

Project specific requirements, terms and conditions, etc. for each solicitation will be modified to reflect the contractual requirements for that particular Invitation for Bids or Request for Proposals. These types of requirements will be specified in Instructions to Bidders, Terms and Conditions, General Provisions, and Specifications.

100.04 EQUAL OPPORTUNITY

The City Contracts Office shall be responsible for ensuring the procurement of products, commodities, and services are in a manner that affords all responsible businesses a fair and equal opportunity to compete.

SECTION 101

CONTRACT DOCUMENT INTERPRETATION

101.01 INTENT OF CONTRACT DOCUMENTS

- A. The sections of the contract documents are complementary, and what is called for by any one shall be as binding as if called for by all. The intent of the contract documents is to include in the contract price the cost of all labor and materials, water, fuel, tools, plant, equipment, light, transportation, and all other expenses as may be necessary for the proper execution of the work.
- B. Any work shown on the Plans and not covered in the Specifications, or included in the Specifications and not shown on the Plans, shall be executed by the Contractor as though shown both on the Plans and included in the Specifications. If the Plans and Specifications should be contradictory in any part, the Specifications shall govern. Special specifications shall govern over standard specifications.
- C. If the Contractor, in the course of the work, finds any discrepancy between the Plans and the physical layout, or any errors or omissions in Plans or layout, he shall immediately so inform the Engineer, and the Engineer shall promptly verify them. Any work done after such discovery without written consent of the Engineer authorizing the same shall be done at the Contractor's risk.
- D. Any incidental and/or appurtenant items not specifically called for in the Plans and Specifications, but which are necessary to complete the work in accordance with the requirements of good practice, as determined by the Engineer, shall be included as a part of the Contractor's bid price and furnished at no additional cost to the Owner.

- E. In interpreting the contract documents, words describing materials or work which have a well known technical or trade meaning, unless otherwise specifically defined in the contract documents, shall be constructed in accordance with such well known meaning recognized by architects, engineers, and the trade.

101.02 ORDER OF PRECEDENCE

Any inconsistency in this solicitation or contract shall be resolved by giving precedence in the following order: (a) Terms and Conditions; (b) Proposal Requirements; (c) Contract Form; (d) other documents, exhibits, and attachments (excluding the contract drawings); (e) the specifications; and (f) the contract drawings.

101.03 SPECIAL PROVISIONS, SPECIAL SPECIFICATIONS

Special Provisions or Special Specifications may be written to expand upon, modify or cancel these general provisions or the standard specifications. If the special provisions and general provisions are contradictory, the special provisions shall govern. If the special specifications and standard specifications are contradictory, the special specifications shall govern.

101.04 STANDARD MANUFACTURER

Wherever the terms "standard", "recognized" or "reputable" manufacturers are used, they shall be construed as meaning manufacturers who have been engaged in the business of fabricating materials, equipment, or supplies of the nature called for by the Specifications for a reasonable period of time prior to the date set for opening of bids, and who can demonstrate to the satisfaction of the City that said manufacturer has successfully installed equipment, materials, or supplies of the type proposed to be furnished in at least three instances and that the performance of such materials, equipment, or supplies for a period of over twelve months prior to the date fixed for opening bids shall, prima facie, be deemed to have been engaged in such business for a reasonable length of time.

101.05 "OR EQUAL" CLAUSE

Whenever in any section of the contract documents, any article, material, or equipment is defined by describing a proprietary product, or by using the name of manufacturer or vendor, the term "or equal" if not inserted, shall not be construed in such a manner as to exclude manufacturers' products of comparable quality, design, and efficiency, subject to review and approval by the Engineer. The Engineer may require that proposed equals be submitted for review and approval.

101.06 TIME OF ESSENCE

In as much as the Contract concerns a needed improvement, the provisions of the Contract relating to the time of performance and completion of work are of the essence of this Contract. The Contractor shall begin work on the day specified in the Notice to Proceed and shall prosecute the work diligently so as to assure completion of the work within the number of calendar days or date specified, or the date to which the time for completion may have been extended.

101.07 PARTIAL WAIVER OR WAIVER BY ACQUIESCENCE

Partial waiver or waiver by acquiescence of any of the general or special provisions of this contract shall not constitute waiver of any of the other provisions contained in the Contract Documents.

SECTION 102

COMPLIANCE WITH LAWS

102.01 LAWS AND REGULATIONS

This contract is subject to and shall be interpreted under the laws of the State of Colorado, and the Charter, City Code, Ordinances, Rules and Regulations of the City of Colorado Springs, Colorado, a Colorado Home Rule City. Court Jurisdiction shall exclusively be in the District Court for El Paso County. The Contractor shall insure that the Contractor and the Contractor's employees, agents, and officers are familiar with, and comply with, applicable Federal, State, and Local laws and regulations as now written or hereafter amended.

102.02 PUBLIC IMPROVEMENT ASSESSMENT

If the cost of the improvement to be constructed under the contract is to be assessed upon the owners of land benefited by such improvement, upon complaint of any such landowner that the improvement is not being constructed in accordance with the contract, the City Council may consider the complaint and make such order in the premises as shall be just to ensure compliance with the contract.

102.03 ALL LEGAL PROVISIONS INCLUDED

It is the intention and agreement of the parties to this contract that all legal provisions of law required to be inserted, shall be and are inserted. However, if by mistake or otherwise, some such provision is not inserted, or is not inserted in proper form, then upon application of either party, the contract shall be amended so as to strictly comply with the law and without prejudice to the rights of either party.

102.04 SEVERABILITY

If any provisions of this contract shall be held unconstitutional, illegal, or void, such finding shall not affect any other provisions of this contract.

102.05 REQUIREMENTS FOR CORPORATIONS OR INDIVIDUALS DOMICILED OUTSIDE THE STATE OF COLORADO

Unless otherwise decided by reason of the amount of the Contract involved, or other good reason, before or at the time that the Contract is awarded to a corporation outside the State of Colorado, such corporation must have carried out the proper procedure authorized to do business in the State of Colorado, designate a place of business therein, and appoint an agent for service of process. Such corporation must furnish the City with a certificate from the Secretary of the State of Colorado to the effect that a Certificate of Authority to do business in the State of Colorado has been issued by his office and there shall also be procured from the Colorado Secretary of State a photostatic or certified copy of the designation of place of business and appointment of agent for service of process, or a letter from the Colorado Secretary of State that such designation of place of business and agent for service of process have been made. In the event the successful bidder is an individual operating a sole proprietorship, a partnership or joint venture, the execution of these Contract Documents by such successful bidder shall amount to an appointment of the Sheriff of El Paso County, Colorado, as the agent for service of process of such successful bidder for any and all disputes that may arise under the Contract with acknowledgment that the State of Colorado shall be the proper venue for determination of such a dispute.

102.06 LICENSES AND PERMITS

It shall be the responsibility of the successful bidder to obtain, at his expense, all necessary licenses and permits to do the project, in accordance with applicable Federal, State and local laws, regulations and ordinances. Typical permits and fees include, but are not limited to, Excavation/Boring Permits, Concrete Construction Permits, Fugitive Dust Permits, Regional Building Permits, Pavement Degradation fees, as well as Traffic Control and Barricade Plans to be approved by the City Traffic Division for all work within public rights-of-way and easements i.e. (curb and gutter, sidewalks, pedestrian ramps and cross pans).

SECTION 103

AWARD AND EXECUTION OF CONTRACT

103.01 AWARD

The contract shall be awarded to the lowest responsive and responsible bidder in the best interests of the City as specified in the Instructions to Bidders of the Invitation for Bids or Request for Proposals.

103.02 CONTRACTS EXECUTED

Each contract must be executed in one (1) original copy and no more. There shall be executed original counterparts of the Contractor's Performance, Labor and Material Payment and Maintenance Bonds in equal number to the executed original counterparts of the contract. Each Bond counterpart shall have an original Power of Attorney attached. One (1) copy will be delivered to the Contractor. The successful bidder shall provide compensation insurance and public liability and property damage insurance as outlined in the contract. The costs of executing the bonds, contract and insurance, including all notarial fees and expense, are to be paid by the Contractor to whom the contract is awarded.

103.03 VERBAL AGREEMENTS

No verbal agreements or conversations with any agent or employee of the City either before or after execution of the contract, shall affect or modify any of the terms or obligations contained in any of the documents comprising the contract.

103.04 CONTRACT SECURITY

The Contractor shall furnish good and sufficient Performance, Labor and Material Payment and Maintenance Bonds on the form attached hereto in an amount not less than the full amount of the contract price as security for the faithful performance of the contract, for the payment of all persons performing labor and furnishing material in connection with the work, and for all guarantees of materials and workmanship required in the Contract. If at any time during the continuance of the contract a surety on the Contractor's bond or bonds becomes irresponsible, the City shall have the right to require additional and sufficient sureties which the Contractor shall furnish within ten (10) days after written notice to do so. Any additional surety bonds shall cover the entire original contract amount and any increases thereto.

103.05 BOND FORMS

Bonds shall be furnished on forms prepared by the City. Copies of the City/PPRTA Bond Forms will be included in the Exhibits Section of the Invitation for Bids.

103.06 INDEPENDENT CONTRACTOR

In the performance of the Contractor's obligations under this contract, it is understood, acknowledged and agreed between the parties that the Contractor is at all times acting and performing as an Independent Contractor, and the City shall neither have nor exercise any control or direction over the manner and means by which the Contractor performs the Contractor's obligations under this contract, except as otherwise stated within the contract terms. The Contractor understands and agrees that the contractor and the contractor's employees, agents, servants, or other personnel are not City employees. The Contractor shall be solely responsible for payment of salaries, wages, payroll taxes, unemployment benefits or any other form of compensation or benefit to the Contractor or any of the Contractor's employees, agents, servants or other personnel performing services or work under this contract, whether it be of a direct or indirect nature. Further in that regard, it is expressly understood and agreed that for such purposes neither the Contractor nor the Contractor's employees, agents, servants or other personnel shall be entitled to any City payroll, insurance, unemployment, worker's compensation, retirement or any other benefits whatsoever.

SECTION 104**THE CONTRACT FOLLOWING EXECUTION****104.01 MATERIALS**

Unless otherwise stipulated in the contract, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light power, transportation, and other facilities necessary for the execution and completion of the work. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

104.02 SCHEDULE

The Contractor shall be responsible for planning, scheduling, and reporting the progress of the work to ensure timely completion of the work as called for in the Contract Documents. The Contractor shall prepare a Project Schedule that shall be used for coordination, for evaluation of progress, and for the evaluation of changes to the Contract. The Schedule shall include all activities, including those of subcontractors, Contractor's engineers and surveyors, and suppliers. Seasonal and weather constraints, utility coordination, railroad restrictions, right of way restrictions, traffic constraints, environmental constraints, other project interfaces, expected job learning curves and other constraints shall be considered when preparing the Project Schedule, including any phasing or sequencing of the work specified in the Contract Documents. Days scheduled as no work days shall be indicated. The Schedule shall consist of a Methods Statement as defined in part A. below and a progress schedule consisting of (1) a Critical Path Method (CPM) schedule as defined in part B. below, or (2) a Bar Chart schedule as defined in part C. below. A CPM Schedule shall be required if the contract exceeds \$250,000 or if the construction period exceeds 150 calendar days, unless the Contract Documents stipulate otherwise. The CPM Schedule shall utilize Primavera's Suretrak Project Manager software or be capable of being read and manipulated by Suretrak Project Manager software. The Schedule shall show all work completed within the contract time.

The Contractor shall submit two copies of all required schedule information as described below. Schedules, schedule updates, diagrams and reports using CPM shall also be submitted electronically in the appropriate software format. All schedules, diagrams, and reports shall include a title, project number, date of preparation, and the name of the Contractor.

The Bar Chart or Critical Path Method 90-day schedule shall be submitted at least 10 working days prior to the start of the work. The Project Engineer's review of the Schedule will not exceed 5 working days. Work shall not begin until the Schedule is accepted in writing, unless otherwise approved by the Project Engineer.

A. Methods Statement. A Methods Statement shall be prepared for the prominent features listed in the Contract Documents, and for any feature not listed in the Contract Documents that the Contractor considers a controlling factor for timely completion. The Methods Statement shall be a detailed narrative describing each feature and all work necessary to complete the feature. The Methods Statement shall be submitted with the Contractor's schedule. The following format is required:

1. Feature: Name of the feature;
2. Responsibility: Contractor, subcontractor, supplier, utility, etc. responsible for the feature;
3. Procedures: Procedures to be used to complete the work. The procedure to be used shall include general information regarding methods such as forming, excavation, pouring, heating and curing, backfill and embankment, trenching, protecting the work, etc. When separate or different procedures are to be employed by the Contractor due to seasonal or project phasing requirements, such differing procedures shall be described in the procedure statement;
4. Production Rates: The planned quantity of work per day for each feature;
5. Labor Force: The labor force planned to do the work;
6. Equipment: The number, types, and capacities of equipment planned to do the work;

7. Work Times: The planned time for the work to include:
 - a. number of work days per week
 - b. number of shifts per day
 - c. number of hours per shift

At the Project Engineer's request, the Contractor shall update the Methods Statement, or any part thereof, and submit it with the Job Progress Narrative Report or Schedule Update, whichever is earlier.

- B. Critical Path Method. CPM is a scheduling method which shows the interdependencies between work activities. The critical path is that path through the schedule which, if delayed, will cause a delay to project completion.

The progress schedule shall include as a minimum the prominent features of this project as listed in the Contract Documents. The progress schedule shall include all activities for all work on the project, including subcontracted work, delivery dates for critical material, submittal and review periods, milestone requirements and no work periods. Where the project has specific phases, each phase shall be described separately for each applicable prominent feature.

Construction activity duration shall not exceed 15 calendar days unless approved by the Project Engineer. Series of activities that have aggregate durations of five calendar days or less may be grouped in a single activity. For example, "form, reinforce, and pour pier" could be defined as a single activity rather than three. Single activities or a series of grouped activities of at least 1 calendar day duration may also need to be included in the Project Schedule as determined by the Project Engineer (e.g. same activities but noted separately by location).

Time Scaled Logic Diagram: This diagram shall show the logical progression of all activities required to complete the work defined in the Contract Documents. Activity information shall include activity ID, description, duration, early start and finish dates, late start and finish dates, total float, and responsibility.

1. 90-Day Schedule. The 90-day Schedule shall provide all necessary detail for procurement, construction and submittal activities required during the first 90 days of contract time. This submittal shall include a Time Scaled Logic Diagram.
2. Project Schedule. The Project Schedule submittal shall consist of a Time Scaled Logic Diagram and Schedule Report. It shall be prepared in full and submitted to the Project Engineer within 45 calendar days after the Project Engineer's acceptance of the 90-day Schedule. The Project Engineer's review of the Project Schedule will not exceed one week. Revisions required as a result of the Project Engineer's review shall be submitted within one week. Work shall not continue beyond the initial 90 days until the Project Schedule is accepted in writing, unless otherwise approved by the Project Engineer.

The Project Schedule shall cover the time from the Day of Notice to Proceed to the predicted completion date.

The Schedule Report shall tabulate for each activity the activity ID, description, duration, earliest start and finish date, latest start and finish date, total float time, and responsibility. Other reports and scheduling documentation may be requested by the Project Engineer

3. **Schedule Updates.** The Contractor shall update the 90-day Schedule or the Project Schedule to reflect actual construction progress of all work activities on the project. Updates shall show the previous 30 days progress and a 60-day projection for all work started, completed, or in progress during this three month window.

The Project Schedule shall be updated as of the cutoff date for the monthly progress pay estimate and submitted to the Project Engineer before the payment of the progress pay estimate is approved.

Each of the diagrams, charts, and reports shall comply with the requirements for the Project Schedule above, except that they shall also include the actual completion dates and percentages of completion for the appropriate activities.

C. **Bar Chart.** The Bar Chart shall be time scaled and shall show the following:

- The prominent features, as listed in the Contract Documents.
- Any feature not listed in the Contract Documents that the Contractor considers a controlling factor for timely completion.
- The number of days required to complete each feature and its relationship in time to other features.
- Sufficient space for each feature to permit two additional plots parallel to the original time span plot.
- The anticipated delivery dates for equipment or materials in any feature that could affect timely completion of the project.
- Critical completion dates for any activity within any feature that could affect timely completion of the project.
- Connecting lines between features that show the intended progression of activities.

The Project Schedule shall cover the time from the Day of Notice to Proceed to the predicted completion date. The Project Schedule shall be updated as of the cutoff date for the monthly progress pay estimate and submitted to the Project Engineer before the payment of the progress pay estimate is approved. The Contractor shall provide a copy of the original bar chart showing, for each feature, the days actually worked and the anticipated days required to complete.

A Job Progress Narrative Report shall be submitted bi-weekly as a minimum and with all Schedule updates. It shall detail the description of job progress, problem areas, current and anticipated delaying factors and their anticipated effects, impacts to job milestones or project completion, any corrective action proposed or taken, and any minor revisions to the Schedule. If the Job Progress Narrative Report indicates problem areas and impacts to job milestones or project completion, a revised Schedule Update shall also be submitted as specified below.

Revision of the Schedule may be required, as determined by the Project Engineer, for: a major revision in the schedule logic or methods of construction; the addition, deletion, or revision of activities required by contract modification; delays in milestones or the completion of the project; or for prosecution of work that revises the phasing or staging which is represented on the plans or on the progress schedule. If in the opinion of the Project Engineer, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve project progress, including those steps that may be required by the Project Engineer, without additional costs to the City. In those circumstances where the Contractor is behind schedule, the City may require the Contractor to increase the number of shifts, overtime operations, days of work,

and/or the amount of construction plant, and to submit such changes and revisions to the schedule to the Project Engineer for approval that will demonstrate how the approved rate of required progress will be regained. Failure of the Contractor to comply with the requirements of the Project Engineer under this subsection shall be grounds for a determination by the City that the Contractor is not prosecuting the work with sufficient diligence to ensure timely completion of the contract as required.

If it is determined that a revision to the Schedule is required, it shall be provided to the Project Engineer for review within 15 calendar days of written notification. The Project Engineer's review of the revised schedule will not exceed 5 working days. Revisions required as a result of the Project Engineer's review shall be submitted within 5 working days. When accepted by the Project Engineer in writing, the revised schedule shall become the Project Schedule.

The Contractor shall participate in the Project Engineer's review and evaluation of the submittals. Meetings will be held to review progress and planning when requested by the Project Engineer or Contractor. The Project Engineer may request additional project scheduling information and documentation as deemed necessary, including reports and other information that may be reasonably generated using CPM software if required by the contract.

The Contractor shall prosecute the work according to the Schedule. The Contractor shall be responsible for assuring that its subcontractors, suppliers, and engineers/surveyors, at any tier, also prosecute the work according to the Schedule. The City shall be entitled to rely on the Contractor's Schedule for planning and coordination.

Acceptance of the Contractor's Schedule by the Project Engineer is not to be construed as relieving the Contractor of obligation to complete the contract work within the contract time allowed for the portion of the work or the entire Contract, or granting, rejecting or in any other way acting on the Contractor's request for extension of contract time, or claims for additional compensation.

All costs relating to preparation, submittal, and acceptance of the Schedule, reports and revisions, and all requirements of this subsection will not be paid for separately, but shall be included in the work.

Failure of the Contractor to comply with the requirements of this subsection shall be grounds for a determination by the Project Engineer that no further progress payments are to be made until the Contractor is in full compliance.

- D. Project Coordination. The Contractor shall be responsible to coordinate and schedule their work to include utility work anticipated or otherwise. Various City and private utility agencies may be working to install and/or inspect their utilities within the project area. Reasonable delays should be expected for utility lowering, relocations and placement. These delays shall not be reason for granting any monetary change or performance time alteration to the contract. As a minimum, the Contractor's Project Schedule shall reflect coordination with the following:
 - 1. City of Colorado Springs City Engineering Division
 - 2. City of Colorado Springs Traffic and Transportation Engineering Division
 - 3. Colorado Springs Utilities (water, wastewater, gas, electric)
 - 4. City of Colorado Springs Parks, Recreation and Cultural Services Department
 - 5. Telecommunication Companies
- E. Contractor Early Finish or Voluntary Acceleration. Early finish or voluntary acceleration of the schedule by the Contractor is acceptable provided:

1. At the time the Contractor submits the Project Schedule indicating an early finish or voluntary acceleration, the City is notified in writing of actions on the City's part necessary to accommodate the change(s).
2. The City agrees to such change(s) in writing.
3. The City is compensated by the Contractor for any inconvenience or expense associated with the change(s).
4. There is no increased Contract cost.

104.03 SCHEDULE OF VALUES

- A. Promptly following the execution of the contract documents for all lump sum contracts, the Contractor shall prepare and transmit to the Engineer two copies of an itemized breakdown showing the unit quantities of each major construction item and the corresponding unit prices. Such unit prices shall contain all costs including profit **and overhead** of each item complete in place. The total cost of all the items shall equal the contract price for the project. This breakdown, when approved by the Engineer, will be used primarily in determining payment due the Contractor on periodical estimates. If, in the opinion of the Engineer, any unit price submitted by the Contractor is unbalanced, a detailed breakdown of the items contained in the unit will be required.
- B. For contracts bid on a unit price basis, payment shall be made based on the actual number of units installed or performed that are complete, however, payment shall not exceed the total contract amount unless previously approved by Change Order.

104.04 SURVEYS

- A. **Unless otherwise specified in the Contract documents**, the City will furnish all site surveys, easements, pipeline licenses, etc., necessary to authorize construction of any permanent works required in the Contract, where such work is to be done on property other than the City's.
- B. The project limits of construction shall be within the public right-of-way and/or easements. The Contractor shall not trespass on premises outside of the limits of construction for this project, unless permission to do so is granted by the property owner in writing. Copies of any such grant shall be furnished to the City prior to the performance of any work outside the limits of construction.

104.05 TAXATION

The Contractor's payment or exemption of State of Colorado, El Paso County and City Sales and Use Taxes shall be as specified in the as specified in the Instructions to Bidders of the Invitation for Bids or Request for Proposals.

104.06 ASSIGNMENT OF CONTRACT

No assignment or transfer by the Contractor of this contract or any part thereof or of the funds to be received there under by the Contractor will be recognized unless such assignment has had the prior written approval of the City and the surety has been given due notice of such assignment. Such written approval by the City shall not relieve the Contractor of the obligations incurred by them under the terms of this contract. In addition to the usual recitals in assignment contracts, the following language must be set forth:

It is agreed that the funds to be paid to the assignee under this assignment are subject to a prior lien for services rendered or materials supplied for the performance of the work called for in said contract in favor of all persons, firms, or corporations rendering such services or supplying such materials.

104.07 SUBCONTRACTS

The Contractor shall as soon as practical after signing the contract, notify the Project Engineer/Manager in writing, giving the names and qualifications of all subcontractors proposed for work within fifteen (15) business days of notice of award. The City shall have the right to reject subcontractors who are debarred or suspended from doing business with the City of Colorado Springs. The Contractor shall notify the Engineer of each subcontract he awards, giving:

- A. Name, address, and telephone number of the subcontractor
- B. Branch of work covered
- C. Total price of subcontract
- D. Date of subcontract

It shall be the responsibility of the Prime Contractor to file with the Engineer copies of applicable permits and licenses required to do the subcontracted work.

104.08 OTHER CONTRACTS

The City may undertake or award other contracts for additional work at or near the site of the work under this contract. The Contractor shall fully cooperate with the other contractors and with City employees and shall carefully adapt their scheduling and performance of the work to accommodate the additional work, heeding any direction that may be directed by the Project Engineer/Manager. The Contractor shall not commit or permit any act, which will interfere with the performance of work by any other contractor.

SECTION 105

CONSTRUCTION SITE

105.01 LANDS TO BE USED FOR WORK

- A. The City shall provide as indicated the lands upon which the work under this contract is to be done, right-of-way for access to same, and such other lands which are designated on the Drawings for the use of the Contractor, unless otherwise noted in the contract documents.
- B. The Contractor shall provide at their expense and without liability to the City any additional land and access thereto that may be required for temporary construction facilities, or for storage of materials. All such costs will be considered as having been included in the bids for the contractor.

105.02 STORAGE OF MATERIALS

The Contractor shall confine their equipment, apparatus, the storage of materials and operations of Contractor's workmen to limits indicated by law, ordinances, permits, or directions of the City and shall not encumber the project site with materials or equipment not necessary for the project.

105.03 LOADING OF STRUCTURES

The Contractor shall not load or permit any part of the structure to be loaded with a weight that will endanger the structure's safety. The Contractor shall enforce the Engineer's instructions regarding signs, advertisements, fires, and smoke.

105.04 SANITARY PROVISIONS

The Contractor shall provide and maintain on the construction work at all times suitable sanitary facilities for use of those employed on this contract without committing any public nuisance. All toilet facilities shall be subject to the approval of the El Paso County Health Department.

105.05 ACCIDENT PREVENTION

Precaution shall be exercised at all times for the protection of persons, including employees, and property. The safety provisions of all Federal, State and Municipal laws and any other codes relating to the public safety, shall be strictly observed, and the contractor shall, at all times, whether or not so specifically directed by the Engineer, take the necessary precautions to ensure the protection of the public.

Piling, sheeting and shoring shall be utilized where required to prevent any excessive widening or sloughing of the trench which may be detrimental to human safety, traffic flow, the pipe being placed, trees, or to any existing structure.

Excavated materials shall be placed a safe distance from the sides of the trench. Heavy equipment shall not be used or placed near the sides of the trench unless the trench is adequately braced. If the Engineer or any City Safety Officer or their designated representatives become aware of failure to comply with applicable safety regulations, the Engineer or City Safety Officer or their designated representatives may inform the contractor who shall take immediate steps to remedy the noncompliance. The Engineer or City Safety Officer or their designated representatives shall give written notification to the contractor directing them to correct the unsafe acts or conditions. If the contractor fails to comply with such a notification, the Engineer or City Safety Officer or their designated representatives may issue a "stop work" order in accordance with Section 108.05 of the General Provisions of this contract, and work shall only be resumed after adequate corrective actions have been taken to comply with the safety deficiencies the Contractor has been notified of. Stoppage of work because of noncompliance with prescribed accident precaution measures shall not be subject to claim for changed condition or changes in work, nor for extension of completion time.

105.06 PROTECTION OF THE PUBLIC WORKS AND PROPERTY

- A. The Contractor shall provide and maintain all necessary watchmen, barricades, lights, and warning signs and take all necessary precautions for the protection of the public. The contractor shall continuously maintain adequate protection of all work from damage, and shall take all reasonable precautions to protect the City's property from injury or loss arising in connection with the contract. The Contractor shall make good any damage, injury, or loss to their work and to the property of the City resulting from lack of reasonable protective precautions except such as may be due to errors in the contract documents, or caused by agents or employees of the City. The Contractor shall check all cautionary signs at least once a day during this contract.
- B. The Contractor shall continuously maintain adequate protection of all their work from damage and shall protect the City's and adjacent property from injury arising in connection with this contract.
- C. The Contractor will be responsible for any and all damage to property, public or private, that may be caused by their operations in the performance of this contract, and the Contractor shall defend any suit that may be brought against themselves or the City on account of damage inflicted by their operations, and shall pay any judgments awarded to cover such damage.
- D. The Contractor shall be responsible for the restoration of all existing surface or subsurface improvements where damaged as a result of construction at no additional cost to the City.

105.07 PUBLIC ROADS

The Contractor in executing the work on this project shall not unnecessarily impede or interfere with traffic on public highways or streets. Detours, including surfacing, guard rails, temporary bridges and culverts, as may be shown on the drawings, or ordered by the Engineer to accommodate the general public, residents adjacent to the improvements, and the United States mail shall be provided and maintained by the Contractor in a good workmanlike manner. Any call out of City Barricade Crews shall be charged to and paid for by the Contractor.

All work done within the public right-of-way and/or easements requires an approved Traffic Control Plan by the City Traffic Engineering Division.

The Contractor shall provide and maintain in place all barricades, warning signs, lights and other safety devices required to protect the work, divert traffic, and warn pedestrians of open excavation, unfilled trenches, and other areas or conditions which might be hazardous or dangerous during the daylight or dark. Detour routings must first be submitted to the Traffic Engineer for review and approval and shall be signed for the entire route of the detour as required to return the traffic to their street or origination. Detours shall be maintained throughout the period of construction in such a manner as to provide the least amount of disruption to normal traffic flow

All signing and barricading shall conform to the latest edition of the Manual of Uniform Traffic Control Devices for Street and Highways, refer to Section 800. The Traffic Engineer may require flag persons or off-duty police officers for traffic direction. Any call out of the City Barricade crews shall be charged to the Contractor.

105.08 FAILURE TO MAINTAIN SAFE SITE

In case of injury to persons or property by reason of failure to erect and to maintain necessary barricades, safeguards, and signals, or by reason of any act of negligence of the Contractor, or Contractor's subcontractors, agents, or employees, during the performance of this contract, the City may withhold payments due the Contractor so long as shall be reasonably necessary to indemnify the City on account of any such injuries, but the City's payment or failure to pay any sum shall not be considered as a waiver of its right under the indemnity provision of this contract.

105.09 POLLUTION

The Contractor shall at all times ensure compliance with applicable Federal, State, and Municipal air, water, and noise pollution laws and ordinances. The Contractor shall at all times have the proper sprinkling equipment available and shall apply water in the amount determined by each site condition or as directed by the Engineer. The Contractor shall obtain all necessary permits at Contractor's expense, which may include, but not be limited to, El Paso County or a State Air Emission permit, State of Colorado Construction Activity permit, State of Colorado Dewatering permit and Section 404 Corp of Engineers permit, unless otherwise specified in the Invitation for Bids.

105.10 CLEAN-UP

The Contractor shall at all times keep the work area including storage and staging areas, free from accumulations of waste materials. The Contractor is also responsible for any costs associated with cleanup of debris from the work site or storage areas that may inadvertently be scattered outside the area by weather or vandalism. Upon completion of the work, the Contractor shall leave the work area in a clean neat, and orderly condition satisfactory to the Project Engineer/Manager.

105.11 PROTECTION OF EXISTING CURBS, GUTTERS AND DRIVEWAYS

The Contractor shall exercise care in protecting existing curbs, gutters and driveways. Curbs, gutters and driveways damaged by the Contractor's operations shall be removed and replaced by the Contractor at Contractor's expense.

105.12 TEMPORARY CONSTRUCTION

All temporary facilities, including the Contractor's field office which they may maintain at the site, and additional offices erected by subcontractors, shall be neatly constructed and arranged on the site in an orderly manner. The Contractor shall prepare and submit to the Engineer, for approval prior to starting work, a construction plan layout, showing arrangement of storage areas, temporary buildings, equipment, and work areas. The Contractor shall provide suitable weather-tight storage sheds of capacity required to contain all materials which might be damaged by storage in the open. The Contractor shall at all times keep copies of all contract documents readily accessible at their office at the site.

105.13 TEMPORARY WATER SUPPLY

The Contractor shall provide at Contractor's own expense temporary water connections and water supply necessary for the prosecution of the work and permit all contractors on the work to use this supply at a reasonable prorated charge, or by submetering. The Contractor shall pay for all water consumed in the work, and shall arrange with municipal authorities for temporary connections and payment of service charges. (Use most current Code of the City of Colorado Springs). Upon completion of the contract work, all temporary waterlines shall be removed.

105.14 TEMPORARY ELECTRIC LIGHT AND POWER

The Contractor shall arrange with the City Utility Departments for temporary electric light and power necessary for the prosecution of the work. The Contractor shall pay for all electric current consumed, and shall permit all contractors on the work to use this supply at a reasonable prorated charge, or by submetering.

105.15 TEMPORARY HEAT

The Contractor shall provide adequate, temporary heat required during construction. Until the building or work area is enclosed, heavy tarpaulin shall be used to enclose any space requiring heating or protection from weather during construction operations. After the heating plant is in operating condition and the building is enclosed, heat may be provided from the permanent heating plant if such is approved by the Engineer. In such case, the Contractor shall arrange to operate the plant, connect permanent or temporary radiation or unit heaters, and so maintain the plant during operation that it will be turned over to the City undamaged at the completion of the work. The Contractor shall provide all fuel required. In no case shall salamander heating be used in finished or plastered surfaces; instead, gas-steam radiators, unit heaters, or other suitable and approved means shall be used if the permanent heating plant is not available.

105.16 TEMPORARY ENCLOSURES

The Contractor shall provide and maintain temporary enclosures for the work as may be required to permit continuation of interior work during inclement weather, if wall and roof construction has progressed sufficiently to make interior work possible.

SECTION 106**INSURANCE AND INDEMNITY****106.01 CONTRACTOR'S INSURANCE**

The Contractor shall secure and maintain during the life of this contract such insurance policies as will protect Contractor and Contractor's Subcontractors, the City, and each of their officers, agents and employees from claims for bodily injuries, death, or property damage, which may arise from operations under this contract whether such operations be by the Contractor or by any Subcontractor or anyone employed by them directly or indirectly. The Contractor shall not commence work under this contract until Contractor has obtained all insurance required and such insurance has been approved by the City of Colorado Springs. Also, the Contractor shall not allow any Subcontractor to commence work on any subcontract until all similar insurance required of the Subcontractors has been obtained. The following insurance policies are required:

Worker's Compensation Insurance

Contractor shall take out and maintain during the period of this contract, Colorado Worker's Compensation Insurance for the Contractor and all employees of the Contractor. If any service is sublet by the Contractor, the Contractor shall require the subcontractor to provide the same coverage for the subcontractor and the subcontractor's employees. Worker's Compensation Insurance shall include occupational disease provisions covering any obligations of the Contractor in accordance with the provisions of the Worker's Compensation Act of Colorado.

Employer's Liability The Contractor shall take out and maintain during the life of this contract, Employer's Liability Insurance with a limit of \$100,000 in an insurance company authorized to write such insurance in all states where the Contractor will have employees located in the performance of this contract and the Contractor shall require each of his Subcontractors similarly to maintain Employer's Liability Insurance on his employees.

Public Liability The Contractor shall maintain during the life of this contract such Public Liability Insurance as shall protect the Contractor against claims for damages resulting from (a) bodily injury, including wrongful death, and (b) property damage, which may arise from operations under this contract whether such operations be by the Contractor or by any Subcontractor or anyone directly or indirectly employed by either of them.

The Public Liability Insurance required by the preceding sub- paragraph shall include the following extensions of coverage:

1. The coverage shall be provided under a Comprehensive General Liability form of policy or similar thereto.
2. X.C.U. Coverage - If the contract requires any work procedures involving blasting, excavating, tunneling, or other underground work, the City may require Standard Blasting or Explosion Coverage, Standard Collapse Coverage and Standard Underground Coverage, commonly referred to as XCU property damage liability coverage. If this coverage is required, it will be specified in the contract and the limits shall be specified in the Special Provisions.
3. The property damage coverage shall include a Broad Form Property Damage Endorsement.
4. Contractual Liability coverage shall be included.
5. Protective Liability coverage shall be included to protect the Contractor against claims arising out of operations performed by Contractor's Subcontractors.
6. Products Liability and/or Completed Operation coverage shall be included.

Automobile Liability. The Contractor shall take out and maintain during the life of the contract such comprehensive Automobile Liability Insurance as shall protect the Contractor against claims for damages resulting from (1) bodily injury, including wrongful death, and (2) property damage, which may arise from the operations of any owned, hired or non-owned automobiles used by or for the Contractor in any capacity in connection with the carrying out of this contract.

- A. Other forms of insurance shall also be provided if specified in the Special Provisions.
- B. The minimum acceptable policy limits for each project shall be as set forth below or as specified in the Special Provisions. The required insurance coverage shall in no way lessen or limit the liability of the Contractor under the terms of the contract. The Contractor shall procure and maintain at Contractor's own cost and expense, any additional kinds and amounts of insurance that in Contractor's own judgement, may be necessary for his proper protection in the prosecution of the work.

Statutory Workmen's Compensation

Insurance Coverage	Minimum Limits
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Employer's Liability	
each person	\$ 100,000

Comprehensive General Liability

Insurance Coverage	Minimum Limits
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Bodily Injury:	
each occurrence	\$ 500,000
aggregate	\$1,000,000

Property Damage:	
each occurrence	\$ 500,000
aggregate	\$ 500,000

Comprehensive Automobile Liability

Bodily Injury:	
each person	\$ 500,000
each accident	\$ 500,000

Property Damage:	
each accident	\$ 500,000

- C. The Contractor and all Subcontractors shall include the City of Colorado Springs and the City's officers, agents and employees as "additional insured parties" on each policy for each project, except for Worker's Compensation Coverage.
- D. The Contractor shall furnish the Project Engineer with applicable Insurance Policies or Certificates of Insurance with required insurance coverage. They shall contain a provision that thirty (30) days written notice shall be given to the City prior to cancellation or revisions to any of the insurance. These Policies or Certificates of Insurance will be subject to City approval prior to execution of the contract.

106.02 INDEMNIFICATION

Contractor agrees that the Contractor shall indemnify, defend and hold harmless the City, its officers, employees and agents, from and against any and all loss, damage, injuries, claims, costs, including attorney's fees, cause or causes of action, or any liability whatsoever resulting from, or arising out of, or in connection with the Contractor's obligations or actions under this contract, or from any act or obligation of any subcontractor, laborer, material man or agent of the Contractor.

This indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable for or by the Contractor or any subcontractor, manufacturer or supplier under Workmen's Compensation Act, disability benefit acts or other employee benefit acts.

106.03 THIRD PARTY LIABILITY

It is specifically agreed between the parties executing this contract that this contract is not intended by any of the provisions to create in the public or any member thereof any third party beneficiary rights whatsoever, or to authorize anyone not a party to this contract to maintain a suit for personal injuries or property damage pursuant to the terms or provisions of this contract.

106.04 RISK INSURANCE

Unless otherwise set forth in the Contract Documents, the City shall not maintain risk insurance on the project.

SECTION 107

ROYALTIES, PATENT INFRINGEMENTS, SPECIAL LICENSES AND PERMITS

107.01 ROYALTIES AND PATENTS

The Contractor shall pay all applicable royalties and license fees. The Contractor shall defend all suits or claims for infringement of any patent rights and save the City harmless from loss on account thereof except that the City shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified, unless the City has notified the Contractor prior to the signing of the contract that the particular process, design, or product is patented or is believed to be patented.

107.02 PERMITS, LICENSES AND REGULATIONS

Permits and licenses necessary for the prosecution of the work shall be secured and paid for by the Contractor. The Contractor shall be responsible for all water and wastewater tap fees and water and wastewater connection fees as set forth in the Code of the City of Colorado Springs, as amended. Projects that involve Building Permits and sprinkler systems will require water or wastewater connection fees or both.

Licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the City, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules, and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the Plans and Specifications are at variance therewith, he shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in the contract for changes in the work.

Prior to the start of construction, the Contractor shall procure all permits and licenses, pay all charges, fees and taxes, and give all notices necessary and incidental to the due and lawful prosecution of the work. Copies of the fully executed permits shall be furnished to the Engineer. It is the responsibility of the Contractor to be aware of the terms and conditions of all permits, and it is the Contractor's responsibility that the terms and conditions are satisfied." (REF. 102.06, 105.09)

SECTION 108**WORK PROVISIONS AND RULES****108.01 COMMENCEMENT AND COMPLETION OF WORK**

- A. Preconstruction Conference. After issuance of Notice of Award, or as otherwise established by the City, a preconstruction conference shall be held for review of the construction schedule, Contractors written list of Subcontractors and suppliers, project contracts, utility support plan, water control plan, Traffic Control Supervisor name and telephone number, gradations, test results, certifications, to review procedures for handling shop drawings and other submittals, processing applications for payment, and other pertinent items.
- B. The Contractor shall commence work within ten (10) calendar days after the date specified on the Notice to Proceed and complete the contract within the number of calendar days or by the date specified in the proposal form. (Unless otherwise noted the number of days set out in proposal form are calendar days).
- C. The dates fixed for commencement and completion of the work may be extended by the Engineer. All requests for extension of time by the Contractor shall be made in writing to the Engineer and shall set forth the reasons for such requests. The Engineer shall fix the period of extension, if any. The Engineer's decision shall be binding upon the parties hereto. Requests for extension of time received twenty (20) or more days after the occurrence of the delay will not be honored. No requests for extension of time shall be honored if submitted after the completion date.
- D. If satisfactory execution and completion of the contract shall require work or materials in greater amounts or quantities other than those set forth in the contract, then the contract time shall be adjusted at the time of the execution of the Change Order. No allowance will be made for delays or suspension of the prosecution of the work due to the fault of the Contractor.

108.02 FAILURE TO COMPLETE WORK ON TIME, LIQUIDATED DAMAGES

If the Contractor fails to fully perform and complete the work in conformity to the provisions and conditions of the contract within the specified time limit set forth in the contract, including any extensions granted hereto, the Contractor shall pay to the City for each calendar day of delay until such time the contract is complete, liquidated damages at the applicable daily rate below. The amounts shown are considered to be liquidated damages to reimburse the City for the additional cost of construction engineering and contract administration services and in no case are considered a penalty.

Original Contract Amount	Amount of Liquidated Damages Per Day
Less than \$50,000	\$300.00
\$50,000 to \$100,000	\$500.00
\$100,000 to \$500,000	\$700.00
\$500,000 to \$1,000,000	\$900.00
Over \$1,000,000	\$1500.00

108.03 WORK IN BAD WEATHER

No construction work shall be done during stormy, freezing, or inclement weather, except such as can be done satisfactorily, and in a manner to secure first class construction throughout, and then only subject to permission of the Engineer.

The granting of a time extension for inclement weather does not imply or guarantee that additional compensations for incidental and appurtenant work caused by such weather will be approved or authorized by the Engineer. The Contractor is instructed to include as part of the Contractor's total bid price the costs for such weather delays as can be reasonably anticipated. The Engineer will be the sole judge as to the reasonableness of delays for inclement weather.

108.04 EMERGENCY WORK

In an emergency affecting the safety of life or of the work or of adjoining property, the Contractor is, without special instructions or authorization from the Engineer, hereby permitted to act at Contractor's discretion to prevent such threatening loss or injury. Contractor shall also act, without appeal, if so authorized or instructed by the Engineer. Any compensation claimed by the Contractor on account of emergency work shall be determined by agreement or in accordance with the changes in Work Provision of this contract.

108.05 AUTHORITY OF THE ENGINEER

- A. The Engineer shall perform technical inspection of the work. The Engineer has authority to stop the work whenever such stoppage may be necessary to insure the proper execution of the contract. The Engineer shall also have authority to reject all work and materials, which do not conform to the contract and to decide questions, which arise in the execution of the work.
- B. The Engineer shall, within a reasonable time after their presentation to the Engineer, make decisions in writing on all claims submitted to the City or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the contract documents. The Engineer's decisions shall be final.
- C. **Suspension of Work**
The Project Engineer/Manager may order the Contractor, by giving fifteen (15) days written notice, to suspend, delay, or interrupt all or any portion of the work required by the contract for a period of up to 10 ten calendar days, for the convenience of the City at no additional cost.

108.06 CONSTRUCTION OBSERVATION AND INSPECTION

- A. The Engineer shall at all times have access to the work and the Contractor shall provide proper equipment, materials and labor as required for such access and inspection.
- B. All equipment, material, and articles incorporated into the work covered by this contract shall be new and of the most suitable grade for the purpose intended, unless otherwise specifically provided in this contract. The Engineer shall have the right to reject materials and workmanship, which are defective, or require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the City. If the Contractor does not correct such condemned work and remove rejected materials within a reasonable time fixed by written notice, the City may remove them and charge the expense to the Contractor.
- C. Should it be considered necessary or advisable by the Engineer at any time before final acceptance of the entire work to make an examination of work already completed, by removing or tearing out same, the Contractor shall on request promptly furnish necessary facilities, labor and materials. If such work is found to be defective in any material respect due to fault of the Contractor or his subcontractors, he shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, the actual cost of labor and material necessarily involved in the examination and replacement, plus fifteen (15) percent, will be allowed the Contractor.
- D. All materials to be incorporated in the work, all labor performed, all tools, appliances, and methods used shall be subject to the inspection and approval or rejection of the Engineer.

- E. If the Engineer shall point out to the Contractor, Contractor's foreman, or agent any neglect or disregard of the contract provisions, such neglect or disregard shall be remedied and further defective work be at once discontinued.
- F. The Contractor shall execute the work only in the presence of the Engineer or authorized representative, unless provision has been made for the work to proceed without complete engineering supervision or inspection. The presence of the Engineer or authorized representative shall in no way relieve the Contractor of the responsibility of this contract, or be any warrant for the furnishing of bad material or poor workmanship.
- G. The observation of the work by the Engineer is intended to aid the Contractor in applying labor, materials, and workmanship in compliance with the contract provisions. Such observation, however, shall not relieve the Contractor from any of Contractor's contract obligations.

108.07 CONTRACTOR COOPERATION

- A. Discrepancies: If the Contractor, as the work progresses, finds any discrepancies between the Plans and physical conditions or any errors in the Plans or layout as given by the stakes or instructions, it shall be the Contractor's duty to inform the Engineer in writing and the Engineer shall address such discrepancy in a reasonable period of time. Any work done after such discovery until authorized will be done at the Contractor's risk.
- B. Workmen, Methods and Equipment: Permission from the Engineer to use any particular methods, equipment or appliances shall not be so construed as to relieve the Contractor from furnishing other equipment or appliances or adopting other methods when those in use prove unsatisfactory to the Engineer, or as to bind the Engineer to accept work which does not comply with the contract.
- C. All work under this contract shall be performed in a skillful and professional manner. The Project Engineer/ Manager shall have the authority to notify the Contractor in writing, that the Contractor remove from the work site any employee the Project Engineer/Manager deems incompetent, careless, or otherwise objectionable to the general public or the City of Colorado Springs.

108.08 CONTRACTOR'S RESPONSIBILITY FOR WORK

- A. Until the work is accepted by the Engineer as evidenced by the issuance of the Certificate of Completion, the Contractor shall have the charge and care thereof and shall take every necessary precaution against injury or damage to any part thereof by action of the elements or from any other cause, whether arising from the execution or from the nonexecution of the work. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any of the above causes before its completion and acceptance and shall bear the expense thereof.
- B. The Contractor shall be responsible for the preservation of all public and private property, trees, fences, monuments, and other property, along and adjacent to the improvements and shall use suitable precautions necessary to prevent damage to pipes, conduits, and other underground structures. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect or misconduct in the execution of the work, or in consequence of the nonexecution thereof on the part of the Contractor, such property will be restored by the Contractor and at Contractor's expense to a condition similar, or equal to that existing before such damage or injury to the satisfaction of the City's Project Manager.
- C. It shall be the responsibility of the Contractor, when moving or operating equipment, to make all arrangements for temporary crossings of telephone, transmission, pipe lines, railroad tracks, and irrigation ditches. This work shall not be paid for as a separate item but shall be considered as incidental to the project.

108.09 PROTECTION OF UTILITIES

- A. The Contractor's attention is directed to the fact that utilities may encroach on the construction of this project, and also to the importance of protecting all public/private utilities encountered on this project. These may include telecommunications, cablevision, traffic signal lines and power lines, water lines, sewer lines, gas lines, railroad tracks, and other overhead and underground utilities.

Any information concerning underground utilities shown on the drawings is intended to be merely an aid to the Contractor. The accuracy of information with respect to underground utilities is not guaranteed. The Contractor shall make their own investigation, including exploratory excavations, to determine the locations and type of existing mains or service laterals or appurtenances when their presence can be inferred from the presence of other visible facilities, such as building, manholes, inlets, meters and junction boxes, on or adjacent to the site of the work. If the Contractor discovers utility facilities not identified in the plans or specifications or in a position different from that shown in the plans and specifications, the Contractor shall immediately notify verbally and in writing the Engineer and Owner of the utility facility.

- B. Before any excavation is begun in the vicinity of water lines, railroad tracks, or structures, sewer lines, telecommunication conduits or cablevision line, each utility company, department, or company concerned must be notified in advance of such excavation, and such excavation shall not be made until an authorized representative of the utility concerned is at the site.
- C. All utilities encountered must be kept in operation by the Contractor and must be protected and/or repaired at the Contractor's own expense, unless otherwise specified in the contract documents. The Contractor shall be held liable for all damages to any and all public utilities encountered on the project, which damages are due to the Contractor's operations. Such damages shall include all physical damages to utilities and also all damages due to interruption of service of such utilities, when such damages and interruptions are caused by the Contractor's operations.
- D. Where alterations or moving of utilities is not required to permit construction of the project, the Contractor shall take such measures as the Engineer may direct to properly protect these utilities throughout his construction operations and shall cooperate at all times with the proper authorities and/or owners in maintaining service of railroads, conduits, pole lines, transmission lines, pipe lines, sewers, etc., affected by this project.
- E. The costs of damages due to the Contractor's operation or the cost of protecting utilities where alteration or moving is not required to permit construction of the project shall be included in the original contract price for the project.
- F. Should any pipe line, water lines, or gas mains, electrical conduits, sewer pipes, overhead wiring, telecommunication lines, power lines, or any other such utilities, not specifically mentioned and provided for elsewhere as a part of this contract, have to be moved, repaired, reconditioned, or revised due to the construction, or moved temporarily to permit construction of the project the party or parties owning and operating such utilities shall perform the actual work of moving, repairing, reconditioning, or revising such utilities. The cost of this work shall be borne by the utility companies involved, unless other agreements are reached with the City.

G. Existing Utilities

1. Existing Gas Lines: As of April 1, 1983, Federal law requires anyone who uncovers a gas line to report it to the gas company and allow it to be inspected by the gas company personnel before it is backfilled. The Gas Department is to be notified prior to any excavation around gas lines. A Gas Department inspector is to be notified and present on site prior to construction activities around gas lines.
2. Existing Sewer Mains and Services: All relocation, replacement protection shown on the plans or determined necessary by the inspector shall be performed according to the latest Wastewater Department Standard Specifications. Minimum 48 hours notice must be given to the Wastewater Department prior to any related work.

The Contractor shall adjust sanitary sewer manhole rims to an elevation acceptable to the City Wastewater Department. The Contractor shall contact the City Wastewater Department twenty-four (24) hours prior to manhole rim adjustments.

3. Existing Water Mains and Services: All relocation, replacement or protection shown on the plans or determined necessary by the inspector shall be performed according to the latest Water Department Standard Specifications and the Water Service Standard Specifications. Minimum 48-hour notice must be given to the Water Department prior to any related work. The Water Department reserves the right to schedule any operations at their discretion and to provide for any requirements determined necessary to perform the work. The Contractor shall coordinate with the Water Department and receive their approval prior to performance of the work.

H. Utility Support Systems:

1. If required by the contract documents, or requested by the Engineer, the Contractor shall submit shop drawings for the method of temporary support for all existing utilities during construction. The temporary support details for existing utilities shall be submitted for review and approval prior to performance of the work. Shop drawings must bear the seal of a Professional Engineer registered in the State of Colorado, unless so waived by the City.
 2. Regardless of City approved shop drawings, the Contractor shall be responsible for the satisfactory support of the utility system and any damages that may occur to the utility involved.
- I. Electric Utility Installation: Any electric facilities unless otherwise noted are to be relocated or modified by the City of Colorado Springs Electric Department. The Contractor shall coordinate the work with the Electric Department and the Electric Department's Contractor.
- J. Telecommunication Agencies: Any telephone facilities unless otherwise noted are to be relocated or modified by the respective private utility company. The Contractor shall coordinate the work with the respective private utility company.
- K. Cablevision: The television utilities are to be relocated by Cablevision. The Contractor shall coordinate the work with Cablevision.

108.10 LABOR

- A. The Contractor shall employ only competent and skilled workmen and foremen in the conduct of work on this contract. The Contractor shall at all times enforce strict discipline and good order among Contractor's employees. The Engineer shall have the authority to order the removal from the work of any Contractor's employee who refuses or neglects to observe any of the provisions of these Plans or Specifications, or who is incompetent, abusive, threatening, or disorderly in conduct, and any such person shall not again be employed on the project.
- B. Colorado labor shall be employed to perform the work to the extent of not less than eighty percent (80%) of each type or class of labor in the several classifications of skilled and common labor employed on this project, as required and defined in Section 8-17-107 C.R.S. 1973.
- C. Eight (8) hours shall constitute a day's labor and Monday through Friday shall constitute a workweek. In no event shall the City be responsible for overtime pay.

108.11 EMPLOYMENT OF LABOR

The Contractor shall comply with, and protect and hold the City harmless from any violation of all laws and lawful rules and regulations, both of the State of Colorado and of the United States, relating to Workmen's Compensation, unemployment compensation, Social Security, payment for overtime, and all other expenses and conditions of employment under this contract.

108.12 EQUAL EMPLOYMENT OPPORTUNITY

During the performance of this contract, the Contractor agrees as follows:

- A. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, sex, color or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, religion, sex, color or national origin. Such actions shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training; including apprenticeship.

The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

- B. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, sex, color or national origin.

108.13 FEDERAL FUNDS

If this contract is a Federally assisted construction contract all applicable federal requirements, terms and conditions, provisions and forms will be included in the bidding documents. Additionally, the Contractor agrees as follows:

- A. The Contractor shall complete and submit with its bid all federal forms and certifications included in the bidding documents.
- B. The Contractor will send to each labor union or representative or workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the labor union or workers representative of the Contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- C. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

- D. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Secretary of Labor, State of Colorado Civil Rights Commission and any other governmental agency entity which may be assisting with the funding under this contract for purposes of investigation to ascertain compliance with such rules, regulations and orders.
- E. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this contract or with any such rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further government contracts or Federally assisted construction contracts in accordance with the procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or otherwise provided by law.
- F. The Contractor include the provisions of Paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the city, state, or any federal governmental entity may direct as a means of enforcing such provisions, including sanctions for noncompliance. Provided, however, that in the event the Contractor becomes involved in, or threatened with, litigation with a subcontractor or vendor as a result of such direction by the city, state, or any federal governmental entity, the Contractor may request the city, the state, or the United States to enter into such litigations to protect the interests of such governmental entity.

108.14 SUPERINTENDENCE

The Contractor shall give the work the constant attention necessary to facilitate the progress thereof and shall cooperate with the Engineer and with other Contractors or utility company employees in every way possible. The Contractor shall have at all times, on the work, as Contractor's agent, a competent superintendent capable of reading and thoroughly understanding the Plans and Specifications, and who shall have the necessary authority to receive and promptly execute the instructions and orders from the Engineer or the Engineer's authorized representative. Such superintendent shall be furnished irrespective of the amount of work sublet. The Contractor shall supply the Engineer with a list of phone numbers at which the Contractor, his superintendent and foreman can be reached at any time. The assigned Superintendent must adhere to the cooperation requirements specified in Section 108.07 and is subject to removal if so ordered in writing by the Engineer/Project Manager.

108.15 PREPARATION

All vegetation, stumps, and debris and other objectionable objects shall be removed from the area staked out by the Engineer, and where necessary from the area immediately adjacent thereto. Such debris shall be hauled from the site of the construction and wasted as directed by the Engineer.

108.16 STAKING WORK

The Engineer shall provide reference points (horizontal and vertical control) only, unless otherwise noted in the bid proposal and project specifications. The Contractor shall engage the services of a licensed surveyor or surveying firm (hereinafter referred to as the Surveyor) to be approved by the Engineer. The Surveyor shall perform all detailed construction layout and staking including the staking of all storm sewer, street improvements, and utility relocations in accordance with the plans and specifications. The Contractor shall be responsible for the correctness and accuracy of the detailed layout of finished structures.

Any instrument man or survey assistant employed on the work by the Contractor or his Subcontractors who is judged by the Engineer to be incompetent shall be removed from the work and replaced by a competent individual.

108.17 DEVIATION ALLOWED

Finished surfaces in all cases shall conform with lines, grades, cross sections and dimensions shown on the approved drawings or described in the Specifications. Deviations from the approved drawings and working drawings as may be required by the expediciencies of construction will, in all cases, be determined by the Engineer and authorized in writing. If the Engineer deems it inexpedient to correct work injured or done in an unauthorized manner, an equitable deduction from the contract price of the work done shall be made by the Engineer subject to approval of the City Engineer.

108.18 RIGHT-OF-WAY

The City's right-of-way will in general be adequate for construction purposes. Nothing marked on the drawings shall be interpreted as giving the Contractor exclusive occupancy of the territory provided by the City. The City and its employees for any purpose, and other contractors of the City, for any purpose required by their respective contracts, may enter upon or occupy portion of the land furnished by the City. When the territory of one contract is a necessary or convenient means of access for the execution of another contract, such privileges of access or any other reasonable privilege shall be granted by the Contractor to the extent, amount, in the manner and at times necessary. No such joint occupancy or use of the territory shall be made the basis of any claim for delay or damages.

108.19 SHOP DRAWINGS AND SUBMITTALS

- A. The Contractor shall submit to the Engineer all shop drawings, submittals and schedules required for the work, including those pertaining to structural and reinforcing steel within fifteen calendar days from the date of the Notice of Award. The Contractor shall make any corrections in the drawings required by the Engineer, and resubmit the same without delay.
- B. Three final copies of all shop drawings, submittals and schedules shall be submitted to the Engineer, who after checking will retain two copies and return one copy to the Contractor. The Engineer's approval of shop drawings of equipment and material shall extend only to determining the conformity of such equipment and materials with the general features of the design drawings prepared by the Engineer. It shall be the responsibility of the Contractor to determine the correctness of all dimensions and minor details of such equipment and materials so that when incorporated in the work, correct operations will result.

108.20 RECORD DRAWINGS

The Contractor shall maintain an up-to-date set of contract documents, legibly marked, depicting all constructed improvements at the site or as otherwise specified and shall submit a complete set labeled "Project Record" to the Engineer upon completion of the project.

- A. Drawings:
 - 1. Depths of various elements of foundation in relation to finish floor datum.
 - 2. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements and project survey control.
 - 3. Location of internal utilities and appurtenances concealed in the construction, referenced to permanent surface improvements and project survey control.
 - 4. Field changes of dimensions and detail.
 - 5. Changes made by Field Order or by Change Order.
 - 6. Details not on original Contract Drawings.

B. Specifications and Addenda:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
2. Changes made by Field Order or by Change Order.

108.21 MATERIALS

- A. Unless otherwise stipulated in the Specifications, all workmanship, equipment, materials, and articles incorporated in the work covered by this contract are to be new and of the best grade of their respective kinds for the purpose. The Contractor shall furnish to the Engineer for the Engineer's approval, the name of the manufacturer of machinery, mechanical and other equipment, which he contemplates installing, together with their performance capacities and other pertinent information including but not limited to instruction manuals pertaining to the use and operation of such machinery, mechanical and other equipment.
- B. When required by the Specifications, or when called for by the Engineer, the Contractor shall furnish for approval full information concerning the materials or articles which he contemplates incorporating in the work. Samples of materials shall be submitted for approval when so directed. Machinery, equipment, materials, and articles installed or used without such approval shall be at the risk of subsequent rejection.

108.22 TESTING OF MATERIALS

- A. Tests and Inspections. The City will employ and pay for the services of an approved testing laboratory to perform specified services for the field testing of:

Soil Compaction Control
Cast-in-Place Concrete
Asphalt Concrete Pavement

The Contractor shall perform, or arrange for the performance, and pay all costs in connection therewith, all other tests and inspections required by the contract documents. The Contractor shall pay for all testing laboratory services in connection with tests verifying conformance of proposed materials and installation with project requirements including, but not limited to, mix designs, riprap, gradation tests for embedment, fill and backfill materials. The City shall pay for testing laboratory services in connection with tests on materials after incorporation into the project, unless retesting of materials is necessary because of the failure of the materials to meet the project requirements. The Contractor shall obtain the City's written acceptance of the testing laboratory before having services performed.

- B. Requirements for Independent Testing Consultants.

Comply with "Recommended Requirements for Independent Laboratory Qualifications", latest edition, published by the personnel, facilities, equipment and other qualification data, including; Report of inspection of facilities made by the American Council of Independent Laboratories, and basic requirements of ASTM E-329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction", latest edition.

Submit to the City for prior approval, the name and address of the proposed testing laboratory with description of personnel, facilities, equipment and other qualification data. Certificate of calibration of applicable testing equipment made by an accredited calibrated agency within 12 months prior to submittal date.

C. Test Reports

Testing agency shall be instructed to submit directly to the City three (3) copies of all reports of tests or inspections made, showing compliance, irregularities or deficiencies, identifying project, date of test, location in project, applicable specification section, applicable standard(s) for compliance, observations relating to compliance, name and signature of inspector.

D. Contractor Responsibilities

Furnish access to the work, materials, equipment and labor required to accommodate inspections and test when testing laboratory is retained by the City. In the event retesting of materials, or recompaction is necessary because of the failure of the materials or compaction to meet the project requirements, the cost of said retesting shall be borne by the Contractor. Cost of said retest will be deducted from the final payment amount due the Contractor, or invoiced directly to the Contractor at the City's discretion.

108.23 DIFFERING SITE CONDITIONS

- A. The Contractor shall promptly, and before the conditions are disturbed, give a written notice to the Project Engineer/Manager of (1) subsurface or latent physical conditions at the site which differ materially from those indicated in this contract, or (2) unknown physical conditions at the site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in this contract.
- B. The Project Engineer/Manager shall promptly investigate the site conditions after receiving the notice. If the Engineer/Project Manager determines that conditions do materially differ and cause an increase or decrease in the Contractor's cost of, or the time required for, performing any part of the work under this contract, whether or not changed as a result of the conditions encountered, an equitable adjustment shall be made under this clause and the contract modified accordingly.
- C. No request by the Contractor for an equitable adjustment to the contract shall be allowed, unless the Contractor has given the proper written notice and the Project Engineer/Manager determine the condition is in fact a Differing Site Condition; furthermore, the City of Colorado Springs shall not be liable for an equitable adjustment under this clause if the Contractor disturbed or repaired the condition without prior inspection by the Project Engineer/Manager, or if the contract is completed.

108.24 CHANGED CONDITIONS

- A. When additional information regarding foundation or other conditions becomes available as a result of the excavation work, further testing, or otherwise, it may be found desirable and the City shall have the right to change the location, alignment, dimensions, or design of the work to meet such conditions.

- B. During the progress of the work, the City may find it advisable, and it shall have the right to omit portions of the work and to increase or decrease any items as may be deemed necessary or desirable without changing the unit prices in the proposal, provided such increase or decrease does not exceed fifteen percent (15%) of the total monetary value of the original contract. If the material or labor involved in such a change is not included in the unit prices of the contract, but forms an inseparable part of the work to be done under this contract, and the delay involved in asking for the advertising for bids and the letting of a new contract therefore might result in damage, injury, or impairment of the plant, work system or other property belonging to the City, the City may, in its discretion, declare an emergency and require the Contractor to proceed with such alterations and additions. The Contractor will not, however, be required to perform such extra work and furnish such extra materials without a written Change Order from the Engineer. The parties hereto shall agree upon any sum to be paid for said work in advance of performing it. The Contractor shall make no claims for extra work unless the work was performed as authorized by a properly executed Change Order. Additional compensation or credit for work covered by a Change Order must be determined by one or a combination of the following methods:

1. Unit bid prices previously approved.
2. An agreed lump sum.
3. The actual cost of:
 - a. Labor (including foremen and extra supervision if required).
 - b. Materials entering permanently into the work.
 - c. Rental cost of construction plant and equipment used for the work.
 - d. Power and fuel required for the operation of power equipment used for change order work.
 - e. The Contractor shall furnish a breakdown of cost including but not limited to bills, payrolls, invoices and vouchers covering the cost of the work. To this cost there shall be added a fixed fee to be agreed upon, but not to exceed fifteen percent (15%) of the cost of work. The fee shall be compensation to cover the cost of management, insurance, benefits, bond, profit and any other general expenses.

The cost of Subcontractor's work shall be determined according to methods 2 and 3, above, to which the Contractor may add a maximum of fifteen percent (15%), which amount shall be compensation for the cost of the Contractor's management, insurance, benefits, bond, profit, and any other general expenses.

108.25 CHANGES IN THE WORK

The City may make written changes in the Plans and Specifications or scheduling of the contract within the general scope of this contract at any time by a written order. If such changes add to or deduct from the Contractor's cost of the work, the contract price shall be adjusted accordingly. All such work shall be executed under the conditions of the original contract except that any claim for an extension of time caused thereby shall be allowed and adjusted at the time of ordering such change or at such time as it can be ascertained.

- A. In giving instructions, the Engineer shall have authority to make minor changes in the work not involving extra cost, and not inconsistent with the purpose of the work. No extra work or change shall be made unless in pursuance of a written order by the Engineer, and no claim for an addition to the contract sum shall be valid unless the additional work was so ordered.
- B. The Contractor shall proceed with the work as changed and the value of any such extra work or change shall be determined as provided for in the Agreement.

- C. It shall be expressly understood and agreed to by the contractor that no claim for extra work, will be recognized by the City unless same has been ordered in writing by the Engineer and unless claim for such added work has been filed by the Contractor within five (5) days after the end of the calendar month in which such alleged extra work was performed.

108.26 PROTESTS

If the Contractor considers any work demanded of him to be outside the requirements of the contract, or considers any record or ruling of the Engineer or of the inspectors to be unfair, he shall immediately upon such work being demanded or such record or ruling being made, as in writing, or written instruction or decision, whereupon he shall proceed without delay to perform the work or to conform to the record or ruling, and, within ten (10) days after date of receipt of the written instructions or decisions, he will file a written protest with the Engineer, stating clearly and in detail the basis of his objection. Except for such protests or objections as are made of record in the manner herein specified and within the limit stated, the written records, rulings, instructions, or decisions of the Engineer shall be final and conclusive. Instructions and decisions of the Engineer contained in letters transmitting drawings to the Contractor shall be considered as written instructions or decisions subject to protest or objections as herein provided. In the event of a protest, the protest shall be presented to the City Engineer, the City Engineer's decision shall be final and conclusive.

108.27 REMOVAL AND SUSPENSION FOR DEFECTIVE WORK

All work or material which has been rejected shall be remedied or removed and replaced in an acceptable manner. Additional compensation will not be allowed for such removal and replacement. Any work done beyond the lines and grades shown on the drawings, except as herein provided, will be considered as unauthorized and will not be measured or paid for. Work so done may be ordered removed at the Contractor's expense. Should the Contractor fail to comply promptly with any order of the Engineer made under the provisions of this paragraph, the Engineer shall have the authority to cause said work to be removed and to deduct the cost from any money due, or to become due, from the Contractor. At any time during the course of construction of this project if the provisions of the Plans, Specifications, or contract provisions are being violated by the Contractor or his employees, the Engineer shall have the right and authority to order all construction to cease or material to be removed, until arrangements satisfactory to the Engineer are made by the Contractor for resumption of the work in compliance with the provisions of the contract.

108.28 CLEANING UP AND FINAL INSPECTION

- A. The Contractor shall at the completion of the work, remove all rubbish from and about the work and all tools, equipment, scaffolding, and surplus materials and shall leave the work clean and ready for use. In case of dispute, the City may remove the rubbish and surplus materials and charge the cost to the Contractor.
- B. All sewers, conduits, pipes, and appurtenances and all tanks, pump wells, chambers, buildings, and other structures shall be kept clean during construction and as the work or any part thereof approaches completion, the Contractor shall systematically and thoroughly clean and make any needed repairs to them. Contractor shall furnish at Contractor's own expense, suitable tools and labor for removing all water and cleaning out all dirt, mortar, and foreign substances. Any undue leakage of water into the structures such as to make the work, in the opinion of the Engineer, fall short of first class work, shall be promptly corrected by the Contractor at Contractor's own expense.

Cleaning and repairs shall be arranged, so far as practicable, to be completed upon finishing the construction work. Notice to begin the final cleaning, and repairing, if such is needed, will be given by the Engineer, who at the same time will make his final inspection of the work. The Engineer will not approve the final estimate of any portion of the work until after the final inspection is made and the work found satisfactory.

108.29 CUTTING AND PATCHING

- A. The Contractor shall do all cutting, fitting, or patching of work that may be required to make its several parts fit together or to receive the work of other contractors shown upon, or reasonably implied by the Plans and Specifications for the completed project.
- B. Any cost caused by defective or ill timed work shall be borne by the Contractor.
- C. The Contractor shall not endanger any work by cutting, digging, or otherwise and shall not cut or alter the work of any other contractor without the consent of the Engineer.

108.30 FINAL TESTS

After completion of the work, the Contractor shall make any and all tests required by the Specifications or by Municipal, State or Federal regulations, and where so provided in said regulations shall furnish the City with certificates of inspection by the Municipal, State or Federal regulation bodies. The Contractor shall also make all tests required by the National Board of Fire Underwriters for the purpose of determining insurance rates or other protection of the City or the public.

108.31 CORRECTION OF WORK AFTER FINAL PAYMENT

Neither the final payment nor any provision in the contract documents shall relieve the Contractor of the responsibility for negligence or faulty materials or workmanship within the extent and periods provided by law and by this contract.

108.32 GUARANTEES

- A. All work shall be constructed in compliance with standard construction codes, and all materials and workmanship must be guaranteed for a period of two years from the date of final acceptance. The Contractor guarantee period (two-year warranty period) will not begin until the contract is 100 percent complete, as determined by the Engineer. Acceptance of the 100 percent complete contract shall be requested in writing by the Contractor. Any item requiring repair and/or replacement prior to expiration of the two-year warranty period shall be guaranteed for a period of one-year after the date of said correction or repair or for the remainder of the two-year warranty period, whichever is longer.
- B. In placing orders for equipment, the Contractor shall purchase same only under a written guarantee from the respective manufacturers that the equipment supplied will function satisfactorily as an integral part of the completed project in accordance with the Plans and Specifications. Furthermore, the Contractor shall require that the manufacturer agree in writing at the time order of equipment is placed that manufacturer will be responsible for the proper functioning of the equipment in cooperation with the Contractor, and that whenever necessary during the installation period or tuning up period following construction period, the manufacturer will supply without additional cost to the City, such superintendence and mechanical labor and any adjustments and additional parts and labor needed to make the equipment function satisfactorily, even if the same was not shown on approved shop drawings.

SECTION 109

PAYMENTS AND ACCEPTANCE OF WORK

109.01 PAYMENTS

Payments will be made as the work progresses at the end of each month or as soon thereafter as practicable in compliance with Title 24, Article 91, Section 103 and Section 110, Colorado Revised Statutes, on statements made and approved by the Engineer. In preparing statements, only completed work will be taken into consideration. No payment will be made for materials in storage and/or delivered to the site, unless otherwise approved by the City.

Payment for work performed by the contractor under these contract documents will be made at the approved unit price or lump sum price for each of the several items as listed in the bid and measured as hereinafter specified. Such payment shall compensate the Contractor for all costs in connection with furnishing all labor, equipment and material required and performing the operations necessary to complete the item in accordance with the contract documents. All incidental work essential to the completion of the project in a workmanlike manner, and including cleanup and disposal of waste or surplus material, shall be accomplished by the contractor without additional cost to the City. The cleanup and disposal of waste or surplus material shall be performed during construction or as soon after as is reasonably possible in order to better maintain the aesthetics and safety of the construction area. The quantities listed in the bid are estimated quantities, and are listed only for convenience in comparing bids. Payment will be made for the actual quantities constructed or installed, unless otherwise noted in these contract documents. However, any changes to plan quantity must be approved through proper change order procedures, said quantities being measured as specified in the contract documents.

If the contract exceeds EIGHTY THOUSAND DOLLARS (\$80,000.00), no monthly payment shall exceed NINETY PERCENT (90%) of the calculated value of any work completed until FIFTY PERCENT (50%) of the work required by the contract has been performed. Thereafter, the City shall pay any of the remaining installments without retaining additional funds, if in the opinion of the City, satisfactory progress is being made under the contract. All other provisions set forth above shall be complied with.

Should the City determine at any point in the project after fifty percent (50%) of the work required has been performed that satisfactory progress is not being made under the contract, the City may retain up to ten percent (10%) of any partial payment requests submitted thereafter, if it is the City's opinion that additional retaining of funds may be necessary to assure proper completion of the project.

109.02 CORRECTION OF WORK BEFORE FINAL PAYMENT

- A. The Contractor shall promptly remove from the premises all materials and work condemned by the Engineer as failing to meet contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute Contractor's own work in accordance with the contract and without expense to the City and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.
- B. All removal and replacement work shall be done at the Contractor's expense. If the Contractor does not take action to remove such condemned work and materials within ten (10) days time thereafter, the City may, upon ten (10) days written notice, sell such materials at auction or at private sale and retain the proceeds without compensation to the Contractor.

109.03 PAYMENTS WITHHELD PRIOR TO FINAL ACCEPTANCE OF WORK

The City may withhold or nullify the whole or part of any certificate of payment to such extent as may be necessary to protect it from loss caused by:

- A. Defective work not remedied.

- B. Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor.
- C. Failure of the Contractor to make payments properly to subcontractors or for material or labor.
- D. Damage to another contractor.

When the above grounds are removed, payment shall be made for amounts withheld because of them.

109.04 ACCEPTANCE OF FINAL PAYMENT

- A. Upon notice that the work is fully completed, the Engineer will make a final inspection. If the Engineer finds the work acceptable under the contract and the contract is fully performed, the work may be finally accepted by the Engineer under the terms and conditions of the contract. The entire balance found by the Engineer to be due the Contractor, including the retained percentage, less any retention based on; (1) the Engineer's estimate of the fair value of the claims against the Contractor; and (2) the cost of completing the incomplete or unsatisfactory items of work with specified amounts for each incomplete or defective item of work; and (3) retentions required by law, shall be due and payable to the Contractor. The date of completion is the date as specified in the Certificate of Completion issued by the Engineer.
- B. Upon completion of the work under the contract and before the Contractor shall receive or be paid for the Engineer's final statement, the City Contracts Office shall publish in a newspaper published in the City of Colorado Springs, a notice that the City has accepted such work as completed according to the Plans and Specifications and rules set forth in the contract; that the Contractor is entitled to final settlement; that after the final publication, the City will pay the full balance due under the contract; and that persons having claims for labor or material furnished the Contractor must present their claim to the City Contracts Office prior to the date specified for such payment. Nothing herein shall be construed as relieving the Contractor and the sureties on the Contractor's bonds from any claim or claims for work or labor done or materials or supplies furnished in the execution of the contract.
- C. The making and acceptance of the final payment shall constitute a waiver of all claims by the Contractor against the City.
- D. If, after the work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor, and the Engineer so certifies, the City may, upon Certificate of Completion by the Engineer, and without terminating the contract, make payment of the balance due for that portion of the work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment and acceptance of the project shall constitute a waiver of all claims by the Contractor but acceptance shall not constitute a waiver of City claims against the Contractor.
- E. Advertising for Final Payment and processing of the Final Pay Request shall not take place until after the Contractor has submitted Sales and Use Tax Forms to the City of Colorado Springs and said forms have been reviewed and approved by the City Sales Tax Office.

SECTION 110

TERMINATION OF CONTRACT

110.01 THE CITY'S RIGHT TO TERMINATE CONTRACT

- A. In accordance with the City Charter, performance of the City's obligations under this contract are expressly subject to appropriation of funds by the City Council. Further, in the event that funds are not appropriated in whole or in part sufficient for performance of the City's obligations under this contract, or appropriated funds may not be expended due to City Charter spending limitations, then the City may terminate this contract without compensation to the Contractor.
- B. If the termination is for failure of the contractor to fulfill the contract obligations, the City may terminate the subject contract for Default, and complete the work by contract or otherwise, and the contractor shall be liable for any additional cost incurred by the City. Prior to issuing a Termination for Default, the City will issue a Notice to Cure allowing the contractor a minimum of ten (10) calendar days to prepare a plan to correct whatever failures are causing the contract obligation failure(s). The City will have the right to accept the plan of correction or to continue with the Termination for Default.
- C. Where the contract has been terminated for Default by the City, said termination shall not affect or terminate any of the rights of the City as against the Contractor or his surety then existing or which may thereafter accrue because of such default. Any retention or payment of monies by the City due the Contractor under the terms of the contract shall not release the Contractor or the Contractor's surety from liability for the Contractor's default.
- D. If the Contractor should become bankrupt and a relief from stay is granted to the City, or if the Contractor should make a general assignment for the benefit of Contractor's creditors, or if a receiver should be appointed on account of Contractor insolvency, or if Contractor should persistently or repeatedly refuse or should fail, except in cases for which extensions of time are provided, to supply enough properly skilled workmen or materials, or if Contractor should fail to make payments to subcontractors or for material or labor so as to affect the progress of the work, or breach, or substantially violate any provision of the contract, then the City, upon the written notice of the Engineer may, without prejudice to any other right or remedy, terminate the contract for default and take possession of the premises and of all materials, tools, equipment, and other facilities installed on the work and paid for by the City, and finish the work by whatever method the City may deem expedient. In such cases, the Contractor shall not be entitled to receive any further payment under the contract.
- E. The City may also terminate this contract for convenience of the City, upon written notice to the Contractor, without additional compensation to the Contractor, unless the Contractor has started or performed portions of the contract prior to receiving such notice. If performance of the contract is underway, the City will be liable only for the portions of work actually satisfactorily completed up to the point of the issuance of the Notice of Termination for Convenience. In no event shall the City be liable for unperformed work or anticipated profits or overhead. Upon receipt of this notice the Contractor shall immediately: discontinue all services affected (unless the notice directs otherwise), and deliver to the City all data, drawings, specifications, reports, estimates, summaries, and other information and materials accumulated in performing this contract, whether completed or in process.

110.02 COMPLETION OF CONTRACTS IN DEFAULT

- A. If for any reason a contract is declared in default, the City shall have the right without process or action at law to take over all or any portion of the work and complete it in any manner the City deems most appropriate. Written notice shall be given the Contractor by the City that the contract has been declared in default, and upon receiving such notice, the Contractor shall peaceably relinquish possession of the said work or the parts thereof specified in the notice.
- B. The City may, at its option and at a rental which it considers reasonable, retain all material, equipment, and tools on the work until the work has been completed.
- C. Neither the City nor any officer, agent or employee of the City shall be in any way liable or accountable to the Contractor or the Contractor's surety for the method by which the completion of the said work, or any portion thereof, may be accomplished or for the price paid. Should the cost of completing the work be in excess of the original contract price, the Contractor and Contractor's surety shall be responsible for such excess cost. Should the cost of such completion, including all proper charges, be less than the original contract price, the amount so saved shall accrue to the City. Neither by taking over the work nor by declaring the contract in default shall the City forfeit the right to recover damages from the Contractor or Contractor's surety for failure to complete the entire contract.

110.03 REMOVAL OF EQUIPMENT

Except as provided in Section 110.01 above, in the case of termination of this contract before completion from any cause whatever, the Contractor, if notified to do so by the City, shall promptly remove any part or all of Contractor's equipment and supplies from the property of the City, failing which the City shall have the right to remove such equipment and supplies at the expense of the Contractor.

SCHEDULE E

EXHIBITS

This section includes the examples of the forms used for submitting the required bonds as well as a sample contract format which will be issued as a result of this solicitation:

- Exhibit 1 -- Sample Contract
- Exhibit 2 -- Equal Employment Status Report
- Exhibit 3 -- Sample Bid Bond
- Exhibit 4 -- Sample Labor and Materials Payment Bond
- Exhibit 5 -- Sample Performance Bond
- Exhibit 6 -- Sample Maintenance Bond
- Exhibit 7 -- Minimum Insurance Requirements
- Exhibit 8 -- Representations and Certifications

EXHIBIT 1 SAMPLE CONTRACT

THE CITY OF COLORADO SPRINGS
and the
**PIKES PEAK RURAL
 TRANSPORTATION AUTHORITY**

**CITY/PPRTA CONSTRUCTION CONTRACT**

Contract Number:		Project Name/Title			
Vendor/Contractor					
Contact Name:		Telephone		Fax	
Address:					
Federal Tax ID #		Please check one:	<input type="checkbox"/> Corporation <input type="checkbox"/> Individual <input type="checkbox"/> Partnership		
City Contracting Specialist	Name & Phone#	City Dept Rep	Name & Phone# & Department Name		
NOT TO EXCEED Contract Amount:		City Account #	Acct Code (5)	Fund (3)	Dept (4) Project (7)

THIS CONTRACT, in the Not to Exceed amount of \$_____ made and entered into this _____ day of _____ 201X by and between the Pikes Peak Rural Transportation Authority (PPRTA), the City of Colorado Springs, Colorado, a municipal corporation, in the County of El Paso, State of Colorado, party to the first part hereinafter in the Contract Documents referred to as the "City", and _____, and trading as an individual or acting as partners consisting of or a corporation organized and existing under the laws of the State of Colorado, hereinafter in the Contract Documents called the "Contractor"; party of the second part.

WITNESSETH:

Whereas the City has heretofore prepared the necessary Contract Documents for: _____ in the City of Colorado Springs; and whereas the party of the second part did on the _____ day of _____ submit to the City their written offer and proposal to do the work therein described under the terms and conditions therein set forth and furnish all labor, materials, tools, equipment, transportation and services for said work in strict conformity with the accompanying Contract Documents which include: Instructions to Bidders, Bid Proposal, Notice of Award, Contract, Performance, Labor and Material Payment and Maintenance Bonds, Notice to Proceed, General Conditions and Special Provisions, Specifications and Drawings.

NOW, THEREFORE, it is hereby agreed that for the considerations and amounts specified in the Bid Proposal and the total contract amount designated above and in the Notice of Award, to be paid by the City to the Contractor, Contractor agrees to furnish all materials and to perform all work as set forth in his proposal and as required by the Contract Documents, which are attached hereto and incorporated herein by this reference.

It is further agreed that the Contractor will start work promptly and continue to work diligently until completed. The contractor shall complete all work within **210 calendar days** after the Notice to Proceed as per the specifications and drawings. The Contractor shall provide a two-year guarantee on all works performed under this contract after the job has been completed and accepted.

FISCAL OBLIGATIONS OF CITY

This Agreement is expressly made subject to the limitations of the Colorado Constitution and Section 7-60 of the Charter of the City of Colorado Springs. Nothing herein shall constitute, nor be deemed to constitute, the creation of a debt or multi-year fiscal obligation or an obligation of future appropriations by the City Council of Colorado Springs, contrary to Article X, § 20, Colo. Const., or any other constitutional, statutory, or charter debt limitation.

Notwithstanding any other provision of this Agreement, with respect to any financial obligation of the City which may arise under this Agreement in any fiscal year after the year of execution, in the event the budget or other means of appropriation for any such year fails to provide funds in sufficient amounts to discharge such obligation, such failure (i) shall act to terminate this Agreement at such time as the then-existing and available appropriations are depleted, and (ii) neither such failure nor termination shall constitute a default or breach of this Agreement, including any sub-agreement, attachment, schedule, or exhibit thereto, by the City. As used herein, the term "appropriation" shall mean and include the due adoption of an appropriation ordinance and budget and the approval of a Budget Detail Report (Resource Allocations) which contains an allocation of sufficient funds for the performance of fiscal obligations arising under this Agreement.

The Contractor and the City agree and acknowledge as a part of this contract, that no Change Order or other form or order or directive may be issued by the City which requires additional compensable work to be performed, which work causes the aggregate amount payable under the contract to exceed the amount appropriated for this contract as listed above, unless the Contractor has been given a written assurance by the City that lawful appropriations to cover the costs of the additional work have been made

The Contractor and the City further agree and acknowledge as a part of this contract that no Change Order or other form or order or directive which requires additional compensable work to be performed under this contract shall be issued by the City unless funds are available to pay such additional compensable work performed under this contract, and expressly waives any rights to additional compensation, whether by law or equity, unless, prior to commencing the additional work, the contractor was given a written Change Order describing the additional compensable work to be performed, and setting forth the amount of compensation to be paid, which Change Order was signed by the authorized City Representative. It is the Contractor's sole responsibility to know, determine, and ascertain the authority of the City representative signing any Change Order under this contract.

Contractor agrees that the Contractor shall indemnify, defend and hold harmless the City, its officers, employees and agents, from and against any and all loss, damage, injuries, claims, cause or causes of action, or any liability whatsoever resulting from, or arising out of, or in connection with the Contractor's obligations or negligent actions under this Contract.

Books of Account and Auditing. The Contractor shall make available to the City if requested, true and complete records, which support billing statements, reports, performance indices, and all other related documentation. The City's authorized representatives shall have access during reasonable hours to all records, which are deemed appropriate to auditing billing statements, reports, performance indices, and all other related documentation. The Contractor agrees that it will keep and preserve for at least seven years all documents related to the Contract, which are routinely prepared, collected or compiled by the Contractor during the performance of this contract.

The City's Auditor and the Auditor's authorized representatives shall have the right at any time to audit all of the related documentation. The Contractor shall make all documentation available for examination at the Auditor's request at either the Auditor or Contractor's office and without expense to the City.

GRATUITIES:

- 1) The right of the Contractor to proceed or otherwise perform this Contract, and this Contract may be terminated if the Mayor or his designee, and/or the City Contracting Manager determine, in their sole discretion, that the Contractor or any officer, employee, agent, or other representative whatsoever, of the Contractor offered or gave a gift or hospitality to a City officer, employee, agent or contractor for the purpose of influencing any decision to grant a City Contract or to obtain favorable treatment under any City Contract.
- 2) The terms "hospitality" and "gift" include, but are not limited to, any payment, subscription, advance, forbearance, acceptance, rendering or deposit of money, services, or any thing of value given or offered, including but not limited to food, lodging, transportation, recreation or entertainment, token or award.
- 3) Contract termination under this provision shall constitute an breach of contract by the Contractor, and the Contractor shall be liable to the city for all costs of reletting the contract or completion of the contract. Further, if the Contractor is terminated under this provision, or violates this provision but is not terminated, the Contractor shall be subject to debarment under the City's Procurement Regulations. The rights and remedies of the City provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract."

CONTRACT SIGNATURE PAGE

The Contractor certifies in accord with Section 8-17.5-102(1) C.R.S. that, on the date the Contractor signs this contract, the Contractor does not knowingly employ or contract with an illegal alien who will perform work under this contract and that the Contractor shall participate in the e-verify program or Colorado Department of Labor and Employment program in order to confirm the employment eligibility of all employees who are newly hired for employment or to perform work under this contract. The contractor is expressly prohibited from using basic pilot program procedures to undertake pre-employment screening of job applicants while this Contract and any services under this Contract is being performed.

IN WITNESS WHEREOF, the parties have caused these presents to be executed on the day and the year first above written.

This contract is executed in one (1) original copy.

THE CITY OF COLORADO SPRINGS, COLORADO:

JOHN W. SUTHERS, MAYOR

Date

SECOND PARTY:

Corporate Name

Signature

Date

Title

Witness

**PIKES PEAK RURAL TRANSPORTATION AUTHORITY
(PPRTA):**

APPROVAL SIGNATURE

EXHIBIT 2 EQUAL EMPLOYMENT STATUS REPORT
CITY OF COLORADO SPRINGS

Contractor's Name _____

Street Address _____

City _____ State _____ Zip _____

This firm is:

_____ Independently owned and operated

_____ An Affiliate Parent Company _____
or

_____ A Subsidiary of Address _____
or

_____ A Division City and State _____

Zip _____

Contractor HAS HAS NOT (1) developed and has on file an affirmative action program in conformance with the Rules of the City or 41 CFR 60-2; (2) participated in any previous contract or subcontract subject to the equal opportunity clause either the City or Federal _____ Contract Compliance requirement;

(3) Filed with the City, or where applicable, joint Reporting Committee, or other Federal Agency, all reports due under the applicable. _____ previous contract or subcontract.

Contractor's Equal Employment Opportunity Program _____ has _____ has not been subject to a Federal Equal Opportunity Compliance Review. If so, then when

Signature _____ Date _____

Title _____

RETURN THIS DOCUMENT WITH YOUR BID

EXHIBIT 3 BID BOND**CITY OF COLORADO SPRINGS, COLORADO & PIKES PEAK RURAL TRANSPORTATION
AUTHORITY BID BOND**

1. KNOW ALL MEN BY THESE PRESENTS, THAT:

(contractor name)_____
(address)

as Principal, hereinafter called Principal, and

(surety name)_____
(surety address)

a corporation organized and existing under the laws of the State of _____ and authorized to do business within the STATE OF COLORADO, as Surety, hereinafter called Surety, are held firmly bound unto the CITY OF COLORADO SPRINGS, COLORADO as Obligees, and the PIKES PEAK RURAL TRANSPORTATION AUTHORITY as Obligees, hereinafter called the Obligees, for the use and benefit of claimants as herein below defined, in the amount of NO/100 DOLLARS -
 -- (\$ _____), lawful money of the United States of America, together with interest as may be provided by law, for the payment whereof Principal and Surety bind themselves, their heirs, executors, successors and assigns, jointly and severally, firmly by these presents.

2. WHEREAS, the Principal has submitted to the Obligees a contract bid dated the _____ day of _____ 2016 for the following contract: **B16-T026 NS N CHESTNUT ST OVER S DOUGLAS CREEK CULVERT REPLACEMENT PROJECT CONTRACT #** _____, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

3. NOW THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT, If Principal's bid is accepted by the Obligees and the Principal is awarded the contract in whole or in part, and the Principal shall enter into the contract with the Obligees in accordance with the terms of the Principal's bid, and give such Payment, Performance, and Maintenance bond or bonds as may be specified in the bidding or contract documents with good and sufficient surety for the faithful performance of the Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter into the contract and give the bond or bonds, if the Principal shall promptly pay to the Obligees the amount of this bond as set forth hereinabove, then this obligation shall be null and void, otherwise this obligation shall remain in full force and effect.

Signed and sealed on the dates set forth below.

(witness) FOR: _____

(seal) BY: _____
ITS: _____
this _____ day of _____, 20____

(witness) FOR: _____

(seal) BY: _____
ITS: _____
this _____ day of _____, 20____

BOND # _____

This Bond (___ is) (___ is not) a SBA Guaranteed Bond.

EXHIBIT 4 LABOR AND MATERIAL PAYMENT BOND**CITY OF COLORADO SPRINGS, COLORADO & PIKES PEAK RURAL TRANSPORTATION AUTHORITY LABOR AND MATERIAL PAYMENT BOND**

1. KNOW ALL MEN BY THESE PRESENTS, THAT:

(contractor name)

(address)

as Principal, hereinafter called Principal, and

(surety name)

(surety address)

a corporation organized and existing under the laws of the State of _____ and authorized to do business within the STATE OF COLORADO, as Surety, hereinafter called Surety, are held firmly bound unto the CITY OF COLORADO SPRINGS, COLORADO as Obligees, and the PIKES PEAK RURAL TRANSPORTATION AUTHORITY as Obligees, hereinafter called the Obligees, for the use and benefit of claimants as herein below defined, in the amount of:

NO/100 DOLLARS -- (\$.00), lawful money of the

United States of America, together with interest as may be provided by law, for the payment whereof Principal and Surety bind themselves, their heirs, executors, successors and assigns, jointly and severally, firmly by these presents.

2. WHEREAS, Principal and the Obligees have entered into a contract dated the _____ day of _____, 2016 for the following (project): **B16-T026 NS N CHESTNUT ST OVER SOUTH DOUGLAS CREEK CULVERT REPLACEMENT PROJECT CONTRACT # _____**, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

3. NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Principal shall promptly make payments of all amounts lawfully due to all persons supplying or furnishing the Principal or the Principal's subcontractors with labor, materials, rental machinery, tools or equipment used or performed in the prosecution of the work provided for in the Contract; and if the Principal shall indemnify and save harmless the Obligees to the extent of any payments in connection with the carrying out of the Contract which the Obligees may be required to pay under the law, all in accord with Colorado State Law, Section 38-26-105 C.R.S., then this obligation shall be null and void; otherwise this obligation shall remain in full force and effect.

AND FURTHER, should the Principal or the Principal's subcontractors fail to duly pay for any labor, materials, team hire, sustenance, provisions, provender, or other supplies used or consumed by the Principal or the Principal's subcontractors in the performance of the work contracted to be done or fails to pay any person who supplies rental machinery, tools or equipment, all amounts due as the result of the use of such machinery, tools, or equipment, in the prosecution of the work under the Contract, the Surety shall pay the same in an amount not exceeding the sum specified in this Bond together with interest at the rate of eight percent per annum, in accord with Colorado State Law, Section 38-26-106 C.R.S.

In accord with Colorado State Law, Section 38-26-105 C.R.S., actions against the Principal and Surety under this Bond shall be brought within six months after the final completion of the Contract as defined by the ordinances, rules and regulations of the City of Colorado Springs, Colorado, a home rule City, and not afterwards.

4. The Surety for value received agrees that no extension of time, change in, addition to, or other alteration or modification of the terms, conditions or obligations of the Contract or work to be performed there under, or any forbearance on the part of either the Obligees or the Principal to the other shall in any way release or affect the Surety's liability or obligation on this Bond, and the surety hereby waives notice of any such extension of time, change, addition, modification, alteration or forbearance.

Signed and sealed on the dates set forth below.

_____ (witness)	FOR: _____ (Principal's Name)
_____ (seal)	BY: _____ ITS: _____ this ____ day of _____, 20__
_____ (witness)	FOR: _____ (Surety's Name)
_____ (seal)	BY: _____ ITS: _____ this ____ day of _____, 20__

BOND # _____

This Bond (___ is) (___ is not) a SBA Guaranteed Bond.

66

EXHIBIT 6 MAINTENANCE BOND
CITY OF COLORADO SPRINGS, COLORADO & PIKES PEAK RURAL TRANSPORTATION
AUTHORITY MAINTENANCE BOND

1. KNOW ALL MEN BY THESE PRESENTS, THAT:

(contractor name)

(address)

as Principal, hereinafter called Principal, and

(surety name)

(surety address)

a corporation organized and existing under the laws of the State of _____ and authorized to do business within the STATE OF COLORADO, as Surety, hereinafter called Surety, are held firmly bound unto the CITY OF COLORADO SPRINGS, COLORADO as Obligees, and the PIKES PEAK RURAL TRANSPORTATION AUTHORITY as Obligees, hereinafter called the Obligees, for the use and benefit of claimants as herein below defined, in the amount of ~~NO/100 DOLLARS~~ **(\$ _____ .00)**, lawful money of the United States of America, together with interest as may be provided by law, for the payment whereof Principal and Surety bind themselves, their heirs, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal and the Obligees have entered into a contract dated the _____ day of _____, 2016 for the following (project):

(B16-T026 NS N CHESTNUT ST OVER SOUTH DOUGLAS CREEK CULVERT REPLACEMENT PROJECT CONTRACT # _____), which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

3. NOW THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH THAT, if the Principal shall promptly, properly and with out cost to the Obligees perform all maintenance and other guarantee obligations under the terms of the Contract, including any modifications or extensions thereof granted by the Obligees, for a period of **two (2) years** from the date of final payment upon the Contract by the Obligees, and in the case of each correction or repair, during a period of one year after the date of said correction or repair or for the remaining period of years set forth herein, whichever is longer, then this obligation shall be null and void; otherwise this obligation shall remain in full force and effect.

4. The Surety for value received agrees that no extension of time, change in, addition to, or other alteration or modification of the terms, conditions or obligations of the Contract or work to be performed there under, or any forbearance on the part of either the Obligees or the Principal to the other shall in any way release or affect the Surety's liability or obligation on this Bond, and the surety hereby waives notice of any such extension of time, change, addition, modification, alteration or forbearance.

Signed and sealed on the dates set forth below.

FOR:

(witness)

(seal)

(Principal's Name)

BY: _____

ITS: _____

this _____ day of _____, 20____

FOR:

(witness)

(seal)

(Surety's Name)

BY: _____

ITS: _____

this _____ day of _____, 20____

BOND # _____

This Bond (___ is) (___ is not) a SBA Guaranteed Bond.

EXHIBIT 7 MINIMUM INSURANCE REQUIREMENTS

The minimum insurance requirements specified in the General Provisions, Section 107 shall be carried by all contractors as specified in the City's solicitation package, Special Provisions and Standard Specifications.

- Except for workers compensation and employer's liability insurance, the City of Colorado Springs and the Pikes Peak Rural Transportation Authority must be named as an additional insured. Certificates of Insurance must be submitted before commencing the work and provide 30 days notice prior to **any** cancellation.
- All coverage furnished by contractor is primary, and that any insurance held by the City of Colorado Springs is excess and non-contributory.
- The certificates of insurance shall provide that there will be no cancellation, reduction or modification of coverage without thirty (30) days' prior written notice to the City. If CONTRACTOR does not comply with this section, the City may, in addition to any other remedies it may have, terminate this Agreement, subject to any provision of this Agreement.

The undersigned certifies and agrees to carry and maintain the insurance requirements indicated above throughout the contract Period of Performance.

(Name of Company)

(Signature)

(Date)

RETURN THIS DOCUMENT WITH YOUR BID

EXHIBIT 8 REPRESENTATIONS AND CERTIFICATIONS

1. INSURANCE REQUIREMENTS

This firm shall comply with all insurance requirements and will submit the Insurance Certificates prior to performance start date. If limits are different from the stated amounts, Contractor shall explain variance. Certain endorsements and "additionally insured" statements may require further clarification and specific statements on a project specific basis and should have been described in the Contractor's proposal.

Initials for 1

2. ETHICS VIOLATIONS

- a) The Contractor shall have in place and follow reasonable procedures designed to prevent and detect possible violations described in this clause in its own operations and direct business relationships.
- b) When the Contractor has reasonable grounds to believe that a violation described in this clause may have occurred, the Contractor shall promptly report the possible violation to the City Contracts Specialist in writing.
- c) The Contractor must disclose with the signing of this Contract, the name of any officer, director, or agent who is also an employee of the City and any City employee who owns, directly or indirectly, an interest of five percent (5%) or more in the Contractor's firm or any of its branches.
- d) In addition, the Contractor must report any conflict or apparent conflict, current or discovered during the performance of the Contract, to the City Contracts Specialist.
- e) The Contractor shall not engage in providing gifts, meals or other amenities to City employees. The right of the Contractor to proceed may be terminated by written notice issued by City Contracts Specialist if Contractor offered or gave a gratuity to an officer, official, or employee of the City and intended by the gratuity to obtain a contract or favorable treatment under a contract.
- f) The Contractor shall cooperate fully with the City or any agency investigating a possible violation on behalf of the City. If any violation is determined, the contractor will properly compensate the City.
- g) The Contractor agrees to incorporate the substance of this clause in all subcontracts under this contract.

Initials for 2

3. ILLEGAL ALIENS

If Provider has any employees or subcontractors, Provider shall comply with § 8-17.5, C.R.S. regarding Illegal Aliens – Public Contracts for Services, and this section of this Agreement. 8-17.5-102 includes, in part, that:

- 1. Provider shall not:
 - a. Knowingly employ or contract with an illegal alien to perform work under this Agreement; or
 - b. Enter into a contract with a subcontractor that fails to certify to Provider that the subcontractor shall not knowingly employ or contract with an illegal alien to perform work under this Agreement.
- 2. Provider has verified or attempted to verify that Provider does not employ any illegal aliens and, will participate in the E-Verify Program or State Department program in order to confirm eligibility of all employees who are newly hired to perform work under public contract for services.
- 3. Provider will not use E-Verify Program or State Department program procedures to undertake pre-employment screening of job applicants while the public contract for services is being performed.

4. If Provider obtains actual knowledge that a subcontractor performing work under this Agreement knowingly employs or contracts with an illegal alien, Provider shall:
 - a. Notify the subcontractor and the City within three days that Provider has actual knowledge that the subcontractor is employing or contracting with an illegal alien; and
 - b. Terminate the subcontract with the subcontractor if within three days of receiving the notice under 4.a., the subcontractor does not stop employing or contracting with the illegal alien. However, the Provider shall not terminate the contract with the subcontractor if during this three day period:
 - i. The subcontractor provides information which establishes that the subcontractor has not knowingly employed or contracted with an illegal alien, and
 - ii. The Provider will not employ the illegal aliens in the performance of any City contract.
5. Provider shall comply with any reasonable request by the Department of Labor and Employment made in the course of an investigation that the Department is undertaking pursuant to the authority established in §8-17.5-102(5), C.R.S.
6. If Provider violates this provision, the City may terminate the Agreement for a breach of contract. If the Agreement is terminated, the Provider shall be liable for actual and consequential damages.

Initials for 3

4. COOPERATION WITH OTHER CONTRACTORS

Other City activities/contracts may be in progress or start during the performance of this contract. The Contractor shall coordinate the work harmoniously with the other contractors or City personnel.

Initials for 4

5. INTERNET USE

Should the Contractor require access to City Internet resources in the performance of this requirement, a "Contractor's Internet Use Agreement" form must be separately signed by each individual having access to the City Network. The completed Contractor's Internet Use Agreement will be maintained with this agreement. Inappropriate use of the City Network will be grounds for immediate termination of this Contract.

Initials for 5

6. LITIGATION

If awarded the contract, Contractor shall notify the City within five (5) calendar days after being served with a summons, complaint, or other pleading in any matter which has been filed in any federal or state court or administrative agency. The Contractor shall deliver copies of such document(s) to the City's Procurement Services Manager. The term "litigation" includes an assignment for the benefit of creditors, and filings of bankruptcy, reorganization and/or foreclosure.

Initials for 6

7. CONTRACTOR'S REGISTRATION INFORMATION

Offeror's firm verifies and states that they are (check all that apply):

- _____ Small Business
- _____ Minority Owned Business/Small Disadvantaged Business
- _____ Woman Owned Business
- _____ Veteran Owned Business
- _____ Service-Disabled Veteran Owned Business
- _____ HUBZone Business

Initials for 7

8. CONTRACTOR PERSONNEL

- a) The Contractor shall appoint one of its key personnel as the "Authorized Representative" who shall have the power and authority to interface with the City and represent the Contractor in all administrative matters concerning this Contract, including without limitation such administrative matters as correction of problems modifications, and reduction of costs.
- b) The Authorized Representative shall be the person identified in the Contractor's Proposal, unless the Contractor provides written notice to the City naming another person to serve as its Authorized Representative. Communications received by the City Contracts Specialist from the Authorized Representative shall be deemed to have been received from the Contractor.
- c) The Contractor shall appoint a "Point of Contact" (POC) who shall be responsible for the day-to-day management and supervision of the contract performance. Before commencing the contract, the Contractor shall provide the City in writing with information regarding how to contact the POC including, for example, his or her name, telephone number, facsimile number, pager number, if any, address, and information relating to other means of communication.

The individual, _____ (Name)
with position, _____ (Title)
Can be reached at _____
Work telephone number: _____
Home telephone number: _____
Cellular telephone number: _____
E-mail address: _____

Initials for 8

9. CONTRACTOR'S ACCEPTANCE OF CREDIT CARD PAYMENT METHOD

The Contractor hereby accepts payment using the City's VISA card program. Contractor must submit any necessary paperwork that the City Contracts Specialist needs to complete and return.

Initials for 9

10. CONTRACTOR'S CERTIFICATION

The undersigned hereby affirms that:

- a) He/She is a duly authorized agent of the Contractor;
- b) He/She has read and agrees to the City's standard terms and conditions attached.
- c) The offer is presented in full compliance with the collusive prohibitions of the State of Colorado. The Contractor certifies that no employee of its firm has discussed, or compared the offer with any other offeror or City employee and has not colluded with any other offeror or City employee.
- d) The Contractor certifies that it has checked all of its figures, and understands that the City will not be responsible for any errors or omissions on the part of the Contractor in preparing its bid.
- e) By submitting an offer the Contractor certifies that it has complied and will comply with all requirements of local, state, and federal laws, and that no legal requirements have been or will be violated in making or accepting this solicitation.

I hereby certify that I am submitting the proposal based on my company's capabilities to provide quality products and/or services on time.

Initials for 10

11. CONTRACTOR CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS:

- 1. The offeror certifies to the best of its knowledge and belief, that (i) the Offeror and/or any of its Principals
 - a. Are (), Are not () presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;
 - b. Have (), Have not (), within a three year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (federal, state, local) contract or subcontract; violation of Federal or state antitrust statutes relation to the submission of offers; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statement, tax evasion, or receiving stolen property; and
 - c. Are (), Are not () presently indicated for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in any paragraphs above.
- 2. The Offeror shall provide immediate written notice to the City Contracts Specialist if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reasons of changed circumstances.
- 3. The certification in paragraph 1. above, is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the City, the City Contracts Specialist may terminate the contract resulting from this solicitation for default. Termination for default may result in additional charges being levied for the costs incurred by the City to initiate activities to replace The awarded Contractor.

Initials for 11

12. ACCEPTANCE OF CITY CONTRACTS SPECIALIST'S SOLE AUTHORITY FOR CHANGES

The Contractor hereby agrees (if awarded a contract for this effort), that any changes to the scope of work, subsequent to the original contract signing, shall be generated in writing and an approval signature shall be obtained from the City Contracts Specialist prior to additional work performance.

Initials for 12

SCHEDULE F

SPECIAL PROVISIONS

8.0 SPECIAL PROVISIONS

This section contains any Special Provisions or revisions to the General Provisions that are applicable on the subject project. In the event that the Special Provisions conflict with the "City of Colorado Springs Engineering Division Standard Specifications", latest revision, the Special Provisions listed herein will take precedence.

8.1 DESCRIPTION OF WORK

The work to be done by the Contractor shall consist of the work described in Section H and performing all operations necessary for the construction of this work as described in the plans and specifications, including restoration of all areas disturbed by the construction activities to a condition better than the pre-construction condition.

This project shall generally consist of the work to construct a structure to convey S. Douglas Creek under N. Chestnut Street, and any other related work.

The Contractor shall obtain and pay for all permits, except the City will waive the fees for Traffic Control, Concrete, and Excavation permits that must be obtained from the City of Colorado Springs. The Contractor shall furnish all transportation, materials, tools, equipment, labor and supplies necessary to complete in a workmanlike manner the improvements as shown and specified in these documents.

The Contractor shall be responsible for verification and acceptance of the existing site conditions prior to proposing on the project. The Contractor shall notify the Engineer 48 hours prior to the commencement of construction activities.

The Contractor shall be responsible for all work, whether it be performed by himself or by others under a subcontract agreement.

All work required to construct all items in this contract shall be performed in a safe, careful, and orderly manner with due consideration given to protection of adjoining property, the public, and workmen. Any damage to streets, utilities, public or private property, or the bench marks and construction staking due to the negligence of the Contractor, shall be repaired and restored to its original condition by the Contractor at his expense to the satisfaction of the Engineer. It will be the Contractor's responsibility to ensure that areas not in conflict with new work are not disturbed or damaged during the construction process.

8.2 PRECONSTRUCTION CONFERENCE

Within 10 calendar days after issuance of the Notice of Award, or as otherwise established by the Owner and Engineer, a preconstruction conference shall be held for review of the construction schedule, the Contractor's list of Subcontractors and suppliers, project contracts, Traffic Control Plan with Supervisor name and telephone number and certifications, procedures for handling shop drawings, processing Applications for Payment, and other pertinent items. The Contractor (and Subcontractor) should address any construction problems which may be foreseen in the execution of the project work at the preconstruction conference.

8.3 DRAINAGE AND EROSION CONTROL

The Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the site in performance of the work. Drainage facilities shall be adequate to prevent damage to the work, the site and adjacent property.

The Contractor shall prevent the pollution of drains and watercourses by sanitary waste, sediment, debris, contaminated ground water or other substances resulting from this work. The Contractor shall be required to clean up, treat and/or isolate such materials on a continuing basis to prevent risk of washing into such drainage ways.

The Contractor shall be responsible for capturing and properly disposing of contaminated groundwater.

The Contractor shall obtain a copy of and follow the language of the MS4 permit and all other state and local permits.

The Contractor shall be responsible for preparing a Stormwater Management Plan (SWMP) and obtaining all required state and local storm water discharge permits. The Stormwater Management Plan shown in the contract documents is provided as a guide for the completed condition of the project for the contractor to bid on the project and may be used by the contractor as a portion of the project SWMP or the Contractor may elect to modify or prepare a new SWMP. The approved SWMP must include a Stormwater Management Plan for all phases throughout construction. When a modified or new SWMP is prepared, it must be prepared by a licensed engineer in the State of Colorado and submitted to the Engineer for review and approval prior to applying for permits. The SWMP used to obtain the permits, and any modifications to the SWMP as directed by the permitting agencies, shall be considered the approved SWMP. An approved SWMP shall be submitted to the Engineer with a copy of permit notice prior to beginning construction.

The Contractor shall be responsible for maintaining erosion control and preparing a SWMP for all phases of the project and shall be submitted to the Engineer for review and approval prior to beginning construction.

8.4 CONSTRUCTION PHOTOGRAPHS

The contractor shall provide construction photographs on an ongoing basis throughout the duration of the project as described below:

1. Preconstruction photographs will be required on the project.
2. Construction photographs shall be digital photographs taken with a good quality camera with a minimum of 10 megapixels. The digital photographs shall be submitted to the Engineer on a CD with digital photos properly identified and in the JPEG format. The CD shall be accompanied by an 8 ½" x 11" printout on good quality matte photo paper. A maximum of six photos shall be on each sheet.
3. Photographs shall be taken a minimum of once per week and in sufficient number to document the condition of the site and ongoing work including traffic control.
4. Each photograph (digital and printouts) shall be marked with a date, description and identification number. The identification number shall be referenced in an index with a description of the photos.
5. Each photograph (digital and printouts) must indicate a reference to where it was taken, including whether it is of the northbound or southbound side, span #, and include the direction the photo is taken.
6. The preconstruction photographs shall be delivered to and approved by the Engineer, prior to beginning of construction.
7. The first set of photographs shall be taken before the Contractor moves on the site and the last shall be taken after completion.
8. Construction photographs will not be paid for separately, but will be considered subsidiary to the work.

8.5 PROJECT INFORMATION SIGNS

The Contractor shall be responsible for installing and maintaining all project signs throughout the duration of the Contract. The City will furnish project signs with the PPRTA Logo for placement within the project by the Contractor. The Contractor shall be responsible for moving project signs and for installing completion signs after completion of the project. Project signs will not be paid for separately, but will be considered subsidiary to the work.

8.6 CONSTRUCTION WORK HOURS

The Contractor shall conduct normal activities between the hours of 7:00 a.m. and 7:00 p.m, Monday through Saturday. Work outside that time shall be considered night work and will only be allowed with the permission of the Engineer. Work on Sunday will only be allowed with the permission of the Engineer.

8.7 WORK SITE RESTRICTIONS

The Contractor shall confine the work activities to the area shown in the construction drawings. The Engineer will furnish the contractor with copies of all executed ROW and easement documents for the project. The established work zone shall be marked and secured with an appropriate fence. The fence type shall be preapproved by the Engineer based on discussions with individual property owners/tenants. Approved temporary fences are required at all locations that require removal of an existing fence. Temporary fences are to be considered incidental to the work and will not be paid for separately. Temporary easements on private property are not to be used for stockpiling or storage of materials or equipment. Any additional work area required within adjoining private properties must be acquired by the Contractor by written permission from the property owner. The Contractor shall restore any damage or disruption to other properties utilized in the performance of this project to an equal or better than pre- construction condition at no cost to the City. The Contractor shall hold the City harmless from any claims to damage or disruption of private property.

Contractor personnel shall not unnecessarily enter upon private property without the express written consent of the landowner. The Contractor shall provide the Engineer with a copy of the written permission. The City will be held harmless of Contractor negligence in matters of trespassing.

8.8 COORDINATION WITH PROPERTY OWNERS

The Contractor shall be responsible for notifying the Property Owners and Tenants at least 48 hours in advance of any construction that may affect access, parking and/or existing structures, including fences, adjacent to that property. The Contractor shall also be responsible for notifying property owners and tenants at least one week prior to any major shifts in traffic patterns. Suitable access and parking will be maintained at all times. Relocating of fences and structures shall be coordinated with owners and shall include miscellaneous items including, but not limited to, temporary fence, sod replacement, sprinkler system modifications, etc. These items are considered to be incidental to the work and are to be included in the unit prices.

The Contractor shall coordinate the relocation of fencing, landscaping, sprinklers, control boxes, utility services, street signs and mail boxes and the salvaging of any materials suitable for re-use with the City Inspector and, if on private property, with the respective property owners.

The Contractor shall notify and coordinate the closing and construction of the driveways, curb, gutter and sidewalks with the Project Engineer and the adjoining property owners and tenants in advance of work in writing. Any restrictions on street parking or traffic movement shall be coordinated with the City Traffic Engineer. The Contractor shall make every effort to minimize the inconvenience to the traveling and pedestrian public.

8.9 CONSTRUCTION TRAFFIC RESTRICTIONS

Construction traffic control shall conform to Section 800 of the City of Colorado Springs Standard Specifications as revised herein and the Manual on Uniform Traffic Control Devices and the Supplement for the City of Colorado Springs.

8.10 BUSINESS AND RESIDENTIAL ACCESS

The Contractor shall maintain access to all businesses and residences throughout the project and shall provide at a minimum 48 hours written notice to each business or residence prior to any work on or partial closure of access drives. Access may be limited to half the existing driveway width for limited periods of 48 hours or less during concrete driveway and street construction. Access must at all times accommodate emergency services vehicles. Additional coordination with emergency services is required if the access location to the property is relocated from the

existing location. An additional verbal notice shall be provided to each business or residence 30 minutes prior to the actual access drive partial closure. This supersedes City Standard Specification 805.08.

8.11 SOIL CONDITIONS

The Contractor assumes all risks connected with the surface and subsurface conditions actually encountered by him in performing the work, even though such actual conditions may result in the Contractor performing more or less work than he originally estimated.

The Contractor shall perform whatever exploratory excavations and tests he deems necessary to determine the site conditions.

The Contractor shall utilize all suitable excavated material as approved by the Engineer for raising grades and backfilling the new construction. Additional imported material shall be a well graded non-expansive inorganic soil or as herein after specified.

8.12 UTILITIES

The size and location of all existing utilities as known to the Engineer have been noted on the plans for the information and guidance of the Contractor. The Contractor shall be responsible for the location and protection of all utilities located within his working area regardless of whether or not their existence or location is shown or noted on the drawings.

All overtime costs for inspection by City Utilities shall be at the Contractor's expense and will be billed directly from Colorado Springs Utilities to the Contractor.

It is the Contractor's responsibility to complete required work and to schedule inspections during normal working hours. The Contractor is responsible for contacting each affected utility for their inspectors' working hours. The Contractor is responsible to request an inspection two (2) working days in advance of the inspection. In the case of an overtime inspection, the request must be in writing. The City will not entertain any requests for time extensions for delays caused by the Contractor's failure to properly notify the affected utility of a required inspection or the Contractor's failure to complete the required work by the time of the scheduled inspection.

The accuracy of information furnished in the contract documents with respect to underground utilities is not guaranteed. The Contractor shall make his own investigations, including exploratory excavations, to determine the locations and type of existing mains and service laterals or appurtenances.

The Contractor shall notify all utility companies who may have installations in the area where the work is to be performed and solicit their aid in locating horizontally and vertically utilities prior to any excavation. All utilities encountered must be kept in operation by the Contractor and must be protected and/or repaired at the Contractor's expense.

City of Colorado Springs Utilities

Utility Problems or Questions	(719) 448-4800
Utility Notification Center of Colorado (UNCC)	800-922-1987

Miscellaneous Utility Services

Utility Notification Center of Colorado (UNCC)	800-922-1987
Engineering Division for Inquiries	(719) 385-5918

At least forty-eight (48) hours prior to commencing excavation, the Contractor shall call UNCC at 1-800-922-1987 between the hours of 7:30 A.M. and 4:30 P.M., Monday through Friday, for information concerning the location of buried utilities in the area of construction.

Below is a Pre-Excavation Checklist which the Contractor shall follow prior to commencing construction on the project.

Pre-Excavation List

Utility Notification Center of Colorado (UNCC) called at least two (2) business days prior to construction at: 1-800-922-1987

- | | | |
|--|----|--|
| | 10 | Utilities marked and located on the ground |
| | 11 | Employees briefed and knowledgeable on marking and color codes* |
| | 12 | Employees trained on excavation and safety procedure for Natural Gas Lines |
| | 13 | When excavation approaches gas lines, employees expose lines by careful probing and hand digging |

Standard Utility Marking Color Code

Natural Gas	Yellow
Electric	Red
Water	Blue
Wastewater	Green
Communications	Orange

"The Contractor shall be responsible for coordination and cost of all utility relocations indicated on the plans and not specified to be done by others. Utility locations shown on the plans are approximate."

The contractor shall coordinate work with various Utility companies and other construction taking place within project limits. Notify applicable Utility companies and other Contractors prior to commencing work, if damage occurs, or if conflicts or emergencies arise during work. No schedule extensions will be granted to the Contractor due to utility coordination issues. It is the responsibility of the Contractor to coordinate with utilities in advance to prevent impacts to the project schedule. The following utility companies are believed to have facilities within or near the project limits:

Gas: Colorado Springs Utilities

Contact Person: Jared Harp
Telephone: (719) 668-4240

Water: Colorado Springs Utilities

Contact Person: Adam Baker
Telephone: (719) 668-4737

Waste Water: Colorado Springs Utilities

Contact Person: Adam Baker
Telephone: (719) 668-4737

Electrical Distribution: Colorado Springs Utilities

Contact Person: Dawna Schawe
Telephone: (719) 668-5572

Electrical Transmission: Colorado Springs Utilities

Contact Person: Dawna Schawe
Telephone: (719) 668-5572

Communications: Century Link

Contact Person: Robert Tomaselli
Telephone: (719) 647-5231

Television Cable: Comcast

Contact Person: Dale Stewart
Telephone: (719) 306-2767

School District 11:

Contact Person: Kris Garnhart
Telephone: (719) 477-6013

The work described in the plans and specifications will require full coordination between the Contractor and Utility Companies while performing their respective operations, so the utility work can be completed with minimum delays to all parties concerned.

The Contractor shall coordinate with residences and businesses affected by any sanitary sewer, electric, gas, or water service shut downs at least 48 hours prior to shut down.

The Contractor shall be responsible for coordinating the adjustment of all utilities on this project. The Contractor shall keep each utility company advised of any work being done to their facilities, so that each utility company can coordinate their inspections for final acceptance with the Engineer.

For utility work that is to be performed by a utility company, Contractor shall provide notice to the utility company that the site is ready for the utility work. The written notice, with a copy to the Engineer, shall be given a minimum of four weeks prior to the requested start of the utility work.

The Contractor shall provide, in the bid proposal, a detailed description of the proposed utility coordination program for the project. The program will describe the steps that will be taken to avoid delays in the event that unknown or differing conditions are encountered during construction. The program shall address both public and private utilities. The program shall be submitted to both the affected utilities and the Engineer immediately following the Notice to Proceed for review and approval.

8.13 PUBLIC RELATIONS

The Contractor is required to have both letter and personal contact with residents and owners or operators of the buildings and businesses that are adjacent to the construction area. The Contractor will furnish a list of those contacted to the Engineer.

8.14 SCHEDULE

General Provision Section 104 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

In General Provision 104.02 Schedule, the software requirements in the first paragraph shall be revised as follows:

All CPM schedules submitted for review by the Project Engineer shall include capability of being read and manipulated by Microsoft Project.

General Provision 104.02 Schedule shall include the following:

Upon approval of the baseline schedule by the Engineer, no changes to schedule task durations or schedule logic ties shall be permitted without prior written approval by the Engineer.

8.15 LANDS TO BE USED FOR WORK

General Provision Section 105 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

In General Provision Subsection 105.01 Lands to be Used for Work, add the following sentence to paragraph B:

The storage of materials shall not at anytime disrupt or impact area businesses. Locations of storage, heights of storage, and length of time materials will be stockpiled near businesses shall be approved in writing by the Engineer prior to use.

8.16 PROTECTION OF UTILITIES

General Provision Section 108 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

In General Provision Subsection 108.09 Protection of Utilities, delete the first sentence in paragraph B and replace with the following:

Before any excavation is begun in the vicinity of existing utilities or structures, each utility company, department, or company concerned shall be notified in advance of such excavation, and such excavation shall not be made until an authorized representative of the utility concerned is at the site.

In General Provision Subsection 108.09 Protection of Utilities, delete paragraph K and replace with the following:

Comcast: The television utilities are to be relocated by Comcast. The Contractor shall coordinate the work with Comcast.

General Provision Subsection 108.09 Protection of Utilities shall include the following paragraphs:

L. Natural Gas: Any gas facilities, unless otherwise noted, are to be relocated or modified by the Colorado Springs Utilities Gas Department. The Contractor shall coordinate the work with the Gas Department and the Gas Department's Contractor.

M. Century Link: Any Century Link facilities, unless otherwise noted, are to be relocated or modified by Century Link. The Contractor shall coordinate the work with Century Link and Century Link's Contractor.

N. Electrical Distribution and Transmission: Any electrical distribution and/or transmission facilities, unless otherwise noted, are to be relocated or modified by the Colorado Springs Utilities Electrical Department. The Contractor shall coordinate the work with the Electrical Department and the Electrical Department's Contractor.

8.17 STAKING WORK

General Provision Section 108 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

In General Provision Subsection 108.16 Staking Work, paragraph A shall include:

Staking requirements shall include all structures, underground construction including storm drain and utilities, structures, retaining walls, barriers, fences, and vaults.

Contractor is wholly responsible for the correct horizontal and vertical location of all project items. Items not constructed in the proper location will be removed and replaced in the correct location without additional cost to the project or time to the schedule.

8.18 SHOP DRAWINGS AND SUBMITTALS

The Contractor shall use a system to track various types of submittals. This system shall be submitted to the Engineer for approval at the pre-construction meeting. The system used shall have the information shown below, at a minimum.

- Unique identification # for each submittal and resubmittal
- Date submitted

- Date response required
- Reference to design plan or specification
- Description
- Supplier
- Action
- Date returned

This system will be used by the selected contractor, consultant and City staff to post, review, track, and approve items such as:

- Schedules
- Requests for Information (RFI's),
- Submittals
- Shop drawings
- Change orders
- Materials testing data
- Project pay estimates
- Project photos
- Meeting agenda and minutes

General Provision Section 108 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

In General Provision Subsection 108.19 Shop Drawings and Submittals, delete the first sentence in paragraph A and replace with the following:

The Contractor shall submit to the Engineer all shop drawings, working drawings, and submittals in a timely manner, considering the 14-day review period for shop drawings. Colorado Springs Utilities review of submittals requires a minimum of 21 days. At no time shall shop drawings be submitted less than 30 days prior to anticipated construction of that element. The Contractor shall submit to the Engineer all project schedules within 21 calendar days of Notice of Award for review. The Contractor shall include Engineer review time in the work schedule. Failure of the Contractor to deliver submittals in sufficient time for the Engineer's review shall not constitute a delay on the part of the City. Submittals which may require a review beyond the first submittal shall not constitute a delay on the part of the City. Shop drawings and submittals shall be at a minimum of those items listed in Table 108-1 and 108-2 and any other additional submittals which may be required by the Engineer. The submittals shown in the tables are not all inclusive. Other submittals may be required.

In General Provision Subsection 108.19 Shop Drawings and Submittals, delete the first sentence of paragraph B and replace with the following:

If submittals are made in the form of hard copies, then the Contractor shall submit a minimum of five copies. One of these will be returned to the Contractor after review. If the Contractor wants more than one copy returned he shall submit the desired number of additional copies.

The Contractor may elect to make submittals electronically. If this is done, the submittals shall be made in clear, readable color electronic files in the PDF format. If this is done, the reviewed submittals will be returned in the same format.

The Contractor shall not begin work until shop drawings and schedules are approved by the Engineer.

General Provision Subsection 108.19 Shop Drawings and Submittals shall include the following:

Shop Drawings, Working Drawings, Other submittals, and Construction Drawings.

A. Shop drawings, Working Drawings, and Other Submittals -General. All work shall be performed in accordance with the plans, reviewed shop drawings, working drawings, or other submittals. Specific requirements for the required shop drawings, working drawings, and other submittals for this project are contained in the specifications.

The Contractor shall be responsible for the accuracy of all dimensions and quantities shown on the shop drawings, working drawings, and other submittals. The Contractor shall correlate all information in the Contract, in the submittals, and in all revisions at the project site to insure that there are no conflicts and that the work can be constructed as shown. The Contractor shall be responsible for all information that pertains to the fabrication processes and methods of construction.

Shop drawings, working drawings, and other submittals shall be delivered to the Engineer. The Contractor shall notify the Engineer, in writing, at the time of submittal of shop drawings, working drawings, and other submittals, of any information submitted that deviates from the requirements of the plans and specifications. In addition, specific notation of the deviations or changes from the plans and specifications shall be placed on the shop drawing, working drawing, or other submittal.

The first sheet or page of each set of shop drawings, working drawings, and other submittals shall be reviewed by the Contractor for conformance with the other work on the project, and stamped with a stamp indicating his review of the submittal. Submittals shall be made in complete packages which will allow the Engineer to properly review them for general compliance with the Contract and to effectively evaluate the proposed methods of construction. The allowed time for review shall not begin until such submittals are complete.

The format of the shop drawings, working drawings, and other submittals shall be as follows:

1. All manually drafted shop drawings and working drawings shall be either 34 inches long by 22 inches wide overall, or 17 inches long by 11 inches wide overall. There shall be a 2-inch margin on the left side of the sheet and a 1/2 inch margin on the other three sides. A blank space, 4 inches long by 3 inches wide, shall be left available near the lower right-hand corner of shop drawings, for the Engineer's review stamp.
2. A title block shall be located in the lower right-hand corner of each sheet, and shall show the project number, structure name, contents of the sheet, designer/engineer, sheet number, and revision number.
3. Design notes, calculations, lists, reports, descriptions, catalog cuts, and other on-drawing submittals shall be submitted on 8 1/2 inch by 11 inch sheets.
4. The shop drawings, working drawings, other submittals and all revisions shall be signed and sealed for the Contractor, by a professional engineer registered in the state of Colorado when required by the specifications. Submittals without the required signature and seal will not be accepted and will be returned to the Contractor without action.

Table 108-1 summarizes the minimum required submittals and is included at the end of this subsection. Table 108-1 lists submittals in one location for information. The table clarifies the type of submittal and whether the Contractor's Engineer must sign and seal the submittal. Table 108-1 may not be all inclusive. The Contractor shall provide all submittals required by the Contract, including those not listed in the table.

B. Shop Drawings. The Contractor shall provide shop drawings to adequately control the work. The Contractor shall submit shop drawings to the Engineer for formal review.

The Engineer will review the shop drawings to evaluate that general conformance with the design concept and that general compliance with the information given in the plans and specifications has been achieved. The review does not extend to accuracy of dimensions, means, methods, techniques, sequences, schemes, procedures of construction, or to safety

precautions. The review by the Engineer is not a complete check. Review of the shop drawings does not relieve the Contractor of the responsibility for the correctness of the shop drawings. All work done prior to the Engineer's review of shop drawings shall be at the Contractor's sole risk.

The Engineer may request additional details and require the Contractor to make changes in the shop drawings which are necessary to conform to the provisions and intent of the plans and specifications without additional cost to the project.

After review, the Engineer will return three sets of shop drawings, for use by the Contractor and the Fabricator or Supplier. Returned shop drawings will be stamped with the Engineer's review stamp to indicate one of the following:

Reviewed, no exception taken	Shop drawings or submittals have been reviewed and do not require resubmittal.
Reviewed, revise as noted	14 Shop drawings or submittals have been reviewed and the Contractor shall incorporate the comments noted in the shop drawings into the work. The shop drawings do not require resubmittal.
15 Resubmit, revise as noted	16 Shop drawings or submittals require correction or redrawing and shall be resubmitted for review. Corrections shall be made and the shop drawings shall be resubmitted by the Contractor in the same manner as the first submittal. Specific notation shall be made on the shop drawing to indicate the revisions.
17 Rejected	18 Submittal may or may not have been reviewed, but does not meet the minimum requirements for a review. Rejected submittals shall be repackaged and resubmitted after the submittal meets minimum requirements for review.
19 Submit Specified Item	20 Shop drawings or submittals have been reviewed and are not approved without the submittal of the specified item. Engineer is not responsible for project delays when additional items are required for approval.

The time required for the Engineer's review of each submittal will not exceed 14 days after a complete submittal of shop drawings is received by the Engineer, except reviews performed by Colorado Springs Utilities which will not exceed 21 days. It is the intent of these specifications that no more than one submittal of shop drawings shall be required for anyone particular item. If additional submittals are required by actions of the Contractor, resulting delays shall be the responsibility of the Contractor. If additional submittals are required by the Engineer's actions or if shop drawing review is delayed by the Engineer, and if the resulting delay is material to the project schedule critical path, the Contractor may request an extension of time equal to the number of days exceeding the 14 or 21 day review per submittal for review performed by the Engineer.

All revisions made to the shop drawings after the Engineer's initial review process require re-submittal and will be required to follow time frames as set forth for the initial submittal.

C. Working Drawings. The Contractor shall supplement the plans with working drawings to detail the construction or to provide the Engineer with information on the proposed methods of construction. Unless otherwise specified, the Contractor shall submit six sets of working drawings to the Engineer for information only, who after acknowledging receipt of the working drawings, will retain three copies and return three copies to the Contractor. These drawings will

not be formally reviewed by the Engineer. The Contractor shall submit working drawings to the Engineer 21 days before the start of work.

D. Other Submittals. Other submittals shall be prepared and submitted by the Contractor as defined for working drawings. Unless otherwise specified, two copies shall be submitted to the engineer for information only. The plans or specifications will indicate which submittals require formal review by the Engineer. One record set of all design work performed by the Contractor's Engineer shall be submitted to the Project Engineer.

E. Construction Drawings. The Contractor shall keep one set of plans, reviewed shop drawings, working drawings, and other submittals available on the project site at all times. This set shall be defined as the construction drawings." The Contractor shall note on these construction drawings all changes and deviations from the work shown on the plans, shop drawings, working drawings, and other submittals. The construction drawings shall be kept current as the work progresses and notations shall be made within seven days of the change or deviation. Requests for Information (RFIs) and the answer/response shall be attached to the construction drawings.

At the completion of the project, the first sheet or page of each set of construction drawings shall be stamped "As Constructed" and signed by the Contractor.

Upon completion of the work and prior to final payment, the construction drawings shall be submitted to the Engineer.

F. Furnishing the shop drawings, working drawings, construction drawings, and other submittals will not be measured and paid for separately, but shall be included in the work.

G. Failure of the Contractor to comply with the requirements for shop drawings, working drawings, other submittals, and construction drawings may be considered unsatisfactory contract progress. Monthly progress payments maybe withheld until the requirements are met.

H. Except as specifically noted, all time required for review of shop drawings, working drawings, and other submittals shall be included in the work and shall not be the basis for any claim for a time extension or monetary adjustment except as provided for herein.

Table 108-1
Summary of Contractor Submittals (not all-inclusive)

SPEC SECTION	DESCRIPTION	TYPE	CONTRACTOR P.E. SEAL REQUIRED?
206	Structure Backfill	Certification/Testing	No
300	Aggregate Base Course	Certification/Testing	No
400	Asphalt Concrete Pavement	Certification/Testing	No
504	Modular Block Wall	Design, Material Certifications, Shop Drawing	Yes
509	Paint	Material Data	No
514	Pedestrian Railing	Design, Material Certification, Shop Drawing	Yes

601	Structural Concrete	Mix Designs, Material Certifications, Testing	No
602	Reinforcing Steel	Shop Drawing, Material Certifications	No
606	Guardrail	Working Drawing	No
606	Crash Cushion	Product Data	No
Ch. 4, <i>Water LESS</i>	Water pipe, appurtenances and associated materials	Product Data, Shop Drawing, Material Certifications	No
Ch. 4, <i>Wastewater LESS</i>	Wastewater pipe, appurtenances and associated materials	Product Data, Shop Drawing, Material Certifications	No
09 90 05	Polyurethane Coating	Product Data, Material Certifications	No
26 42 13	Cathodic Protection	Product Data, Material Certifications	No
33 05 01.01	Welded Steel Pipe and Fittings	Product Data, Shop Drawings, Material, Testing and Inspection Certifications	No

* A PE seal is required where the Contractor has provided the design for the item, or performed engineering to modify the details shown on the plans. The PE seal is not required where complete details are provided on the plans.

8.19 PAYMENTS AND RETAINAGE

General Provision Section 109 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

Delete General Provision Subsection 109.01 Payments, and replace with the following:

Payments will be made, and required retainage withheld if applicable, in accordance with this section as the work progresses at the end of each month or as soon thereafter as practicable in compliance with Title 24, Article 91, Section 103 and Section 110, Colorado Revised Statutes, on statements made and approved by the Engineer.

Payment for work performed by the Contractor under these contract documents will be made at the approved unit price or lump sum price for each of the several items as listed in the bid and measured as hereinafter specified. Such payment shall compensate the Contractor for all costs in connection with furnishing all labor, equipment and material required and performing the operations necessary to complete the item in accordance with the contract documents. All incidental work essential to the completion of the project in a workmanlike manner, and including cleanup and disposal of waste or surplus material, shall be accomplished by the contractor without additional cost to the City. The cleanup and disposal of waste or surplus material shall be performed during construction or as soon after as is reasonably possible in order to better maintain the aesthetics and safety of the construction area. The quantities listed in the bid are estimated quantities, and are listed only for convenience in comparing bids. Payment will be made for the actual quantities constructed or installed, unless otherwise noted in these contract documents. However, any changes to plan quantity must be approved through proper change order procedures, said quantities being measured as specified in the contract documents.

1. If the contract exceeds ONE HUNDRED FIFTY THOUSAND DOLLARS (\$150,000.00), and is for the construction, alteration, or repair of any highway, public work, or public improvement, structure, and; the contractor has provided Performance, and Payment Bonds: the City of Colorado Springs shall authorize partial progress payments of the amount due under this contract monthly, or as soon thereafter as practicable, to the contractor, if the contractor is satisfactorily performing the contract. If the City of Colorado Springs finds that satisfactory progress is being achieved during any period for which progress is to be made, the City of Colorado Springs may authorize payment to be made in full without withholding retainage. However, if satisfactory progress has not been made, the City of Colorado Springs may retain a maximum of ten percent (10%) of the amount of the requested payment until satisfactory progress is achieved. When the work is substantially complete, the City of Colorado Springs may retain from the remaining unpaid balance that amount the City Contracting Manager, at the advice of the City's project manager, considers adequate for protection of the City, suppliers and subcontractor's, and shall release to the Contractor all the remaining funds associated with completed and acceptable work.

The withheld percentage of the contract price of any such work, improvement, or construction shall be retained on an invoice-to-invoice basis and shall not be cumulative. In other words, if the contractor is not performing satisfactorily the City of Colorado Springs will hold ten percent (10%) of what is actually due to the contractor. for example, if the contractor is behind schedule and has successfully completed fifty percent (50%) of the work, the City of Colorado Springs will only pay forty percent (40%) of the invoice, withholding ten percent (10%) of what is due until the contractor gets back on schedule. Once the City of Colorado Springs determines that satisfactory progress is being made in all phases of the contract, then no retainage will be held on successfully completed work.

2. Whenever a contractor receives payment pursuant to this section, the contractor shall make payments to each of the subcontractors of any amount actually received which were included in the contractor's request for payment to the City for such subcontracts. The contractor shall make such payments within seven (7) calendar days of receipt of payments from the City in the same manner as the City is required to pay the contractor under this section if the subcontractor is satisfactorily performing under the contract with the contractor. The subcontractor shall pay all suppliers, sub-subcontractors, laborers, and any other persons who provide goods, materials, labor, or equipment to the subcontractor any amounts actually received which were included in the subcontractor's request for payment to the contractor for such persons, in the same manner set forth in this subsection (2) regarding payments by the contractor to the subcontractor. If the subcontractor fails to make such payments in the required manner, the subcontractor shall pay those suppliers, sub-subcontractors, and laborers interest in the same manner set forth in this subsection (2) regarding payments by the contractor to the subcontractor.

At the time a subcontractor submits a request for payment to the contractor, the subcontractor shall also submit to the contractor a list of the subcontractor's suppliers, sub-subcontractors and laborers. The contractor shall be relieved of the requirements of this subsection (2) regarding payment in seven (7) days and interest payment until the subcontractor submits such list. If the contractor fails to make timely payments to the subcontractor as required by this section, the contractor shall pay the subcontractor interest as specified by contract or at the rate of fifteen percent (15%) per annum, whichever is higher, on the amount of the payment which was not made in a timely manner. The interest shall accrue for the period from the required payment date to the date on which payment is made. Nothing in this subsection (2) shall be construed to affect the retention provisions of any contract.

3. **CONTRACTS UNDER ONE HUNDRED FIFTY THOUSAND DOLLARS:** If the contractor is not progressing in accordance with the project schedule or not performing quality work in accordance with the specifications, the Project Manager may, at that point start withholding retainage up to and including ten percent (10%) of the total contract amount.

General Provision Subsection 109.03 Payments Withheld Prior to Final Acceptance of Work shall include the following:

E. Failure by the Contractor to submit all record drawings.

8.20 FINAL INSPECTION AND ACCEPTANCE

General Provision Section 109 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

General Provision Subsection 109.04 shall include the following:

Upon written notice that the Contractor considers all work complete, the Engineer shall make a final inspection with the Owner and Contractor and shall notify the Contractor in writing of incomplete or defective work revealed by the inspection. The Contractor shall promptly remedy such deficiencies.

After the Contractor has remedied all deficiencies to the satisfaction of the Engineer and delivered all construction records, as-built drawings, maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection and other documents (all as required by the Contract Documents), the Owner and Contractor shall be promptly notified in writing by the Engineer that the work is acceptable.

Final Acceptance shall be obtained no more than 90 days after the date of Material Completion as defined in the RFP. If Final Acceptance is not obtained within 90 days of Material Completion, Liquidated Damages, as set forth in General Provision Section 108.02 of the City of Colorado Springs Engineering Division Standard Specifications, shall be applied for each calendar day over 90 days that the contractor has not received Final Acceptance.

8.21 LATE COMPLETION OF THE WORK DISINCENTIVE

If the number of calendar days required to complete the work is in excess of the total number of calendar days in the Contractor's Proposal, a disincentive will be deducted from payments made to the Contractor. This disincentive (D) will equal the actual number of calendar days required to complete the work (C) minus the number of calendar days in the proposal (P) multiplied by the daily cost of \$2900.00.

$$D = (C - P) \times (\$2900.00)$$

The disincentive shall apply in addition to any liquidated damages assessed to the Contractor on the project pursuant to Schedule D, Section 108.02.

8.22 WATERLINE SUBCONTRACTOR

The City of Colorado Springs and Colorado Springs Utilities (CSU) has determined that the subcontractor proposed for the 24" steel waterline replacement is of significant importance for the successful completion of this project. Therefore, only subcontractors prequalified by CSU may perform this waterline replacement work.

CSU has four contractors that have been prequalified through their prequalification process:

Garney Construction Bill Williams 7911 Shaffer Parkway Littleton, CO 80127 bwilliams@garney.com Office 816-741-4600 Ext. 461 Mobile: 719-423-0200 Fax: 303-791-1801

Layne
Kevin Strott
1775 E. 69th Ave.
Denver, CO 80229
KevinStrott@Layne.com
Office 303-287-7700
Fax: 303-287-1790

Western Summit
Christian Baumgart
Pipeline Area Sponsor
WESTERN SUMMIT
CONSTRUCTORS, INC.
9780 Mt. Pyramid Court, Suite 100
Englewood, CO 80112
Office: (303) 298-9500
Mobile: (303) 378-7030
Fax: (303) 325-0304

BT Construction
Cathy Chandler
9885 Emporia Street
Henderson, CO 80640
Office 303-469-0199
Mobile: 303-210-2920
Fax: 303-466-8309

SCHEDULE G

TECHNICAL SPECIFICATIONS

This section contains the Standard Specifications and Revisions of Standard Specifications. Measurement and Payment for all bid items shall be in accordance with Section H, Measurement and Payment, and shall take precedence over the measurement and payment sections of the Standard Specifications or Revisions of Standard Specifications

9.1 STANDARD SPECIFICATIONS

The following are the Standard Specifications that apply to this project. In the event there are conflicting Standard Specifications, the order of precedence will be based upon the order in which the Standard Specifications are listed. Section H Measurement and Payment describes which specific Standard Specification sections apply to each bid item.

All contractors are required to have on the job site and utilize the current updated copy of the Standard Specifications applicable to the work.

Any revisions to the Standard Specifications can be found in the Subsection 9.2 of this document.

A. City of Colorado Springs Standard Specifications

- 1.) The “**City of Colorado Springs Engineering Division Standard Specifications**”, current edition/revision and addendums, except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety, shall apply to this project.
<https://coloradosprings.gov/resident-services/public-works/city-engineering/standard-specifications-manual>

<https://coloradosprings.gov/resident-services/public-works/city-engineering/reference-materials>
- 2.) The “**Pikes Peak Region Asphalt Paving Specifications**”, revised February 2015, except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety, shall apply to this project.
- 3.) The “**City of Colorado Springs Traffic Engineering Signage and Pavement Markings Guidelines**”, revised 11/16/2009, except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety, shall apply to this project.
- 4.) The “**City of Colorado Springs Drainage Criteria Manual, Volume II**”, May 2014 edition and current addendums, except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety, shall apply to this project.
- 5.) The “**City of Colorado Springs Traffic Controls for Street Construction, Utility Work, and Maintenance Operations**”, current edition/revision, except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety, shall apply to this project.

Copies of these documents are available from the City of Colorado Springs, Office Services Division, 30 South Nevada Avenue, Suite L01, Colorado Springs, during regular business hours.

- 6.) The following Sections of the “**City of Colorado Springs Parks and Recreation Specifications**”, current edition/revision, except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety, shall apply to this project.

Section 02751 Cement Concrete Pavement
Section 02920 Seeding and Sodding

Copies of these documents are available from the Colorado Springs Parks, Recreation, and Cultural Services, 1401 Recreation Way, Colorado Springs, during regular business hours.

B. Colorado Springs Utilities Standard Specifications

The Standards Specifications for Colorado Springs Utilities are included in the Colorado Springs Utilities Line Extension and Service Standards (*LESS*) for Electric, Natural Gas, Water and Wastewater, and are available for downloading from CSU's website at:
<https://www.csu.org/Pages/standards-bulletins.aspx>

- 1.) The Standard Specifications for water line construction and protection shall be the **"Colorado Springs Utilities Water Line Extension and Service Standards"**, revised 2014 (including bulletins and revision), except as modified and supplemented hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety.
- 2.) The Standard Specifications for water line construction and protection shall be the **"Colorado Springs Utilities Wastewater Line Extension and Service Standards"**, revised 2015 (including bulletins and revision), except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety.
- 3.) The Standard Specifications for the lighting installation, electrical distribution and electrical transmission line construction and protection shall be the **"Colorado Springs Utilities Electric Line Extension, and Service Standards"**, revised 2016 (including bulletins and revision), except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety.
- 4.) The Standard Specifications for gas line construction and protection shall be the **"Colorado Springs Utilities Natural Gas Line Extension and Service Standards"**, revised 2016 (including bulletins and revision), except as modified and supplemented hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety.

Copies of these documents are available from the Colorado Springs Utilities' Development Services, 111 S. Cascade, Suite 105, Colorado Springs, during regular business hours.

C. Colorado Department of Transportation Standard Specifications

The following sections of the **"Colorado Department of Transportation Standard Specifications for Road and Bridge Construction"**, 2011, except as modified hereinafter, which are incorporated in the contract documents by reference as though embodied herein in their entirety, shall apply to this project.

Section 109 – Measurement and Payment
Section 201 – Clearing and Grubbing
Section 206 – Excavation and Backfill for Structures
Section 207 – Topsoil
Section 208 – Erosion Control
Section 250 – Environmental, Health and Safety Management

Section 420 – Geosynthetics
Section 503 – Drilled Caissons
Section 504 – Cribbing
Section 514 – Pedestrian and Bikeway Railing
Section 515 – Waterproofing Membrane
Section 601 – Structural Concrete
Section 602 – Reinforcing Steel
Section 606 – Guardrail
Section 607 – Fences
Section 613 - Lighting
Section 614 – Traffic Control Devices
Section 620 – Field Facilities
Section 625 – Construction Surveying
Section 626 – Mobilization
Section 627 – Pavement Marking
Section 629 – Survey Monumentation
Section 631 – 36x11 Foot Concrete 3-Sided Culvert (Precast)
Section 701 – Hydraulic Cement
Section 703 – Aggregates
Section 705 – Joints, Waterproofing, and Bearing Materials
Section 708 – Paints
Section 709 – Reinforcing Steel and Wire Rope
Section 710 – Fence and Guardrail
Section 711 – Concrete Curing Materials and Admixtures
Section 712 – Miscellaneous
Section 713 – Traffic Control Materials
Section 715 – Lighting and Electrical Materials

Contractors are required to have on the job site and utilize the current updated copies of the CDOT Standard Specifications for Road and Bridge Construction and Standard Plans – M&S Standards. Copies of both are available from CDOT.

9.2 REVISIONS TO STANDARD SPECIFICATIONS

A. Revisions to City of Colorado Springs Standard Specifications

The following Revisions supplement or modify the City of Colorado Springs Engineering Division Standard Specifications. Measurement and Payment for all bid items shall be in accordance with Section H, Measurement and Payment, and shall take precedence over the measurement and payment sections of the Standard Specifications or revisions thereof.

Revision of Section 200 – Street Section (Excavation and Embankment)
Revision of Section 220 – Removal of Structures and Obstructions
Revision of Section 240 – Reset Structures
Revision of Section 600 – Structural Concrete
Revision of Section 624 – Rip Rap and Grouted Rip Rap Channel Construction
Revision of Section 630 – Storm Drains and Culverts
Revision of Section 800 – Work Zone Traffic Control

The following Revisions supplement or modify the City of Colorado Springs Parks and Recreation Specifications. Measurement and Payment for all bid items shall be in accordance with Section H, Measurement and Payment, and shall take precedence over the measurement and payment sections of the Standard Specifications or revisions thereof.

Revision of Parks Section 02751 Cement Concrete Pavement
Revision of Parks Section 02920 – Seeding and Sodding

B. Additions to Colorado Springs Utilities Water Line Extension and Service Standards

The following Additional specifications supplement the Colorado Springs Utilities Water Line Extension and Service Standards and are incorporated herein:

Section 09 90 05	Polyurethane Coating
Section 26 42 13	Passive Cathodic Protection for Underground and Submerged Piping
Section 33 05 01.01	Welded Steel Pipe and Fittings

**REVISION OF SECTION 200
STREET SECTION**

Section 200 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

Subsection 202 is hereby revised as follows:

Excavation shall have the following additional requirements:

Material removed during the excavation process that is not acceptable for use as embankment fill shall be legally disposed of by the Contractor. It shall not be wasted on private property without written permission of the property owner. Rocks, broken concrete, or other solid materials more than six inches in greatest dimension shall not be placed in any of the embankment areas. Materials not meeting this requirement shall become the property of the Contractor to be removed from the site and legally disposed of. All excess material that is not needed in the embankment fills on the project shall be hauled away from the project.

Subsection 203 is hereby revised as follows:

Embankment shall have the following additional requirements:

Embankment material will also be placed to fill up excavations, holes and depressions to the bottom of the required topsoil layer in unpaved, landscaped areas.

For this project, all fill material required below and extending 6" outside of paved areas shall be Aggregate Base Course (Class 6).

Embankment construction shall include preparation of the areas and surfaces upon which embankment material is to be placed and the placing and compacting of approved material. Only approved materials shall be used in the construction of embankments and fills.

Free running water shall be drained from embankment material before it is placed.

Frozen materials shall not be used in the construction of embankments and fills.

Embankments and fills shall be shaped and maintained so that they are well drained at all times.

Compaction of embankments and fills in unpaved, landscaped areas shall be in accordance with the same moisture and density requirements for subgrade given in Subsection 205.

**REVISION OF SECTION 220
REMOVAL OF STRUCTURES AND OBSTRUCTIONS**

Section 220 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

Subsection 220.01 shall be revised as follows:

The first paragraph shall be revised to include the following additional removal items: portions of present utilities, pipes, trees, chain link fences, guardrails, delineators, sidewalks, driveway, and pavement.

The existing temporary barriers, traffic control devices, fencing, and corrugated plastic pipe shall be removed and salvaged to the City of Colorado Springs. See the specific Subsection 805.02 requirements for removal of existing Temporary Barriers and Temporary Fencing provided herein.

Subsection 220.05 shall be revised to include the following:

Removal of Pavement shall be revised to include the following:

Removal of Pavement shall include the full depth removal of asphalt pavement, curb and gutter, and all other pavement types and elements that are not specifically included in other pay items in the contract.

Existing site observations at miscellaneous locations suggest that the average existing roadway and shoulder pavements consist of asphalt pavement with an approximate thickness varying from 8 inches to 12 inches. This information is provided for reference only. Individual asphalt thicknesses will vary throughout the project. Removals of thicknesses greater or less than the thicknesses indicated above shall be considered incidental to this item.

Saw cutting of pavements shall be full depth, unless otherwise approved by the Engineer.

Removal of Miscellaneous Utilities shall include removal of existing utility pipes, conduits, wires, and their contents that fall within the excavation limits. For removal, existing utilities shall be cut such that the remaining utility is undamaged.

Removal of Driveway shall have the following requirements:

Removal of Driveway shall include the removal of existing concrete or asphalt aprons, curb, curb and gutter, and other elements that make up or define the existing driveway structure. The thicknesses of these materials may vary and shall be considered incidental to this item of work. The Contractor shall be responsible for determining the actual field conditions and requirements for removing the designated driveway.

Driveway elements shall be saw cut to full depth, unless the limits fall on construction joints that are free to pull apart, or unless otherwise approved by the Engineer.

**REVISION OF SECTION 240
RESET STRUCTURES**

Section 240 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

Subsection 240.01 shall be revised as follows:

The first paragraph shall be revised to include the following additional reset items: reset ground sign, reset fence, and adjust manhole.

Subsection 240.02 shall be revised as follows:

Add the following paragraph: Ground signs and sign panels to be reset shall be cleaned after removal and prior to resetting. If required, new poles, hardware, bases or foundations, etc., shall be furnished and installed in accordance with the City of Colorado Springs Traffic Engineering Signage and Pavement Markings Guidelines and Section 614 of the CDOT Standard Specifications for Road and Bridge Construction.

**REVISION OF SECTION 600
STRUCTURAL CONCRETE**

Section 600 of the City of Colorado Springs Engineering Division Standard Specifications is hereby deleted for this project (except as provided below), and replaced with the following:

Section 601 of the CDOT Standard Specifications for Road and Bridge Construction, 2011

**REVISION OF SECTION 624
GROUTED RIP RAP CHANNEL**

Section 624 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

In Subsection 624.02, add the following after the last sentence:

Underdrains shall be installed to release hydrostatic pressure within grouted riprap. Underdrains shall be 2" in diameter installed to the thickness of the riprap to the filter layer. Underdrain should be installed at a minimum of every 3 feet of vertical drop and at a maximum at 25 foot horizontal intervals.

Subsection 624.02 shall include the following:

Description: This work shall also include installing grouted boulders adjacent to and intermixed with the grouted rip rap. The work shall include excavation, grading, and installation of boulders and bedding placed at the locations shown on the contract plans. The materials to be used and the construction of such structures shall be as specified herein.

Materials:

BOULDERS

1. Boulders used shall be the type designated on the contract plans and shall conform to the following:

Boulder Classification	Nominal Size (inches)	Range in Smallest Dimension of Individual Rock Boulders (inches)	Maximum Ratio of Largest to Smallest Rock Dimension of Individual Boulders
B18	1	17 - 20	1.50
B24	2	22 - 26	1.50
B30	3	28 - 32	1.50
B36	3	34 - 38	1.50
B42	4	40 - 44	1.50
B48	4	45 - 51	1.50

2. The specific gravity of the boulders shall be two and one-half (2.5) or greater.
3. Boulder specific gravity shall be according to the bulk-saturated, surface-dry basis, in accordance with AASHTO T85.
4. The bulk density for the boulder shall be 1.3 ton/cy or greater.
5. The boulders shall have a percentage loss of not more than forty percent (40%) after five hundred (500) revolutions when tested in accordance with AASHTO T96.
6. The boulders shall have a percentage loss of not more than ten percent (10%)

after five (5) cycles when tested in accordance with AASHTO T104 for ledge rock using sodium sulfate.

7. The boulders shall have a percentage loss of not more than ten percent (10%) after twelve (12) cycles of freezing and thawing when tested in accordance with AASHTO T103 for ledge rock, procedure A.
8. Rock shall be free of calcite intrusions.
9. Color:
 - a. The color of the boulders shall be brown with brown/orange hues or other acceptable colors approved by Engineer prior to delivery to the project site.
 - b. Color shall be consistent on the entire Project and shall match the color of rock to be used for all other portions of the work.

Preparation:

Channel slope, bottom, or other areas that are to be protected with boulders shall be free of brush, trees, stumps, and other objectionable material and be graded to a smooth compacted surface as shown on the contract documents.

The contractor shall excavate areas to receive boulders to the specified depth (bedding material is not required for boulders).

A. Subgrade Materials:

1. The subgrade materials shall be stable.
2. If unsuitable materials are encountered, they shall be removed and replaced in accordance with Section 202 Excavation, for subgrade that has been excavated in undisturbed soil.

B. Additional Compaction:

1. Additional compaction shall not be required unless specified by Engineer.
2. When subgrade is built up with embankment material it shall be compacted to ninety five percent (95%) maximum density (ASTM D698).

C. Contamination:

1. In-place bedding materials shall not be contaminated with soils, debris or vegetation before the boulders are placed.
2. If contaminated, the bedding material shall be removed and replaced at Contractor's expense.

Placement:

BOULDERS

1. Following excavation and acceptance of subgrade by Engineer, Boulder placement shall commence as follows:

- a. Boulders shall be placed on the prepared subgrade in a manner which will minimize voids.
 - b. The top of all boulders shall be as indicated on the contract documents.
 - c. The boulders shall be carefully picked and arranged so that adjacent rock surfaces match within two (2) inches in top elevation and two (2) inches along the vertical exposed face or channel side of rock.
 - d. Boulders shall be placed such that adjacent boulders "touch" each other and voids do not exceed four (4) inches. It is the intent of construction to minimize voids and grout placed between boulders.
 - e. The Contractor shall, if deemed necessary, support the boulders from falling over before and during the placement of grout, backfill, and completing compaction work on either side of the boulder.
 - f. Smaller rocks shall be "chinked in" to fill all voids behind the boulders. Smaller rocks shall also be used to "chink in gaps larger than four (4) inches. Placement shall be approved by Engineer prior to grouting.
2. Following placement and acceptance of the boulder placement by the Engineer, grouting of the boulders shall commence in conjunction with grouting of the adjacent rip rap and be in accordance with the following:
- a. Prior to placing the grout, any type of debris, fines, smaller rock, or silt shall be removed from around or under and on the boulders.
 - b. Dewatering shall be implemented to guarantee that the grout will not be placed in water and for a period of twenty-four (24) hours after the grout has been placed.
 - c. Keep boulders receiving grout wet at all times prior to receiving grout.
 - d. The concrete grout shall be placed by injection methods by pumping under low pressure, through a two- (2") inch maximum diameter hose to ensure complete penetration of the grout into the void area as detailed on the contract documents. The grout mix shall be stiffened and other measures taken to retain the grout between the boulders.
 - e. Grout placement shall begin at the bottom of the lowest boulder and proceed upward to ensure no air voids exist between the grout, subbase, and boulders.
 - f. Grout shall be placed up to a height of one-half (1/2) of the diameter of the top row of boulders or as directed by Engineer and shall be placed in the voids and behind the boulders and not on the surface of the rocks.
 - g. A "pencil" vibrator shall be used to make sure all voids are filled between the boulders from the subgrade and around the boulders to a depth as shown on the contract documents. The "pencil" vibrator may be used to smooth the appearance of the surface, but Contractor shall use a wood float to smooth and grade the grout around the boulders.
 - h. Grout between boulders shall be recessed one third (1/3) the diameter of the boulders on the side facing the channel.
 - i. Grout should be troweled out and finished to minimize visibility.
 - j. Clean and wash any spillage before the grout sets so the visual surfaces of boulders will be free of grout to provide a clean, natural appearance, or if washing does not clean off grout residue, the Contractor shall wash off any grout residue with muriatic acid and water, using a brush to scrub off the residue.
 - k. Grout shall receive cold or hot weather protection in accordance with Section 600, Structural Concrete.

Rejection of Work and Materials:

The Engineer will reject placed boulders that do not conform to this section. The Contractor shall immediately remove and re-lay the boulders to conform to Specification.

Boulders shall be rejected, which is either delivered to the job site or placed, that does not conform to this section.

Rejected boulders shall be removed from the project site by Contractor at Contractor's expense.

**REVISION OF SECTION 630
STORM DRAINS AND CULVERTS**

Section 630 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

Subsection 631 Scope of Work shall be revised to include the following:

This work also consists of furnishing all materials, labor, tools, and equipment necessary to install a Storm Water Treatment Device (SWTD) and appurtenances as shown on the plans and as herein specified.

Subsection 634 and 635 shall be revised to include the following:

Materials and Design of Storm Water Treatment Devices and appurtenances

The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems deployed for the treatment of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer.

- A. Housing unit of stormwater treatment device shall be constructed of pre-cast or cast-in-place concrete, no exceptions. Precast concrete components shall conform to applicable sections of ASTM C 478, ASTM C 857 and ASTM C 858 and the following
 1. Concrete shall achieve a minimum 28-day compressive strength of 4,000 pounds per square-inch (psi);
 2. Unless otherwise noted, the precast concrete sections shall be designed to withstand lateral earth and AASHTO H-20 traffic loads;
 3. Cement shall be Type III Portland Cement conforming to ASTM C 150;
 4. Aggregates shall conform to ASTM C 33;
 5. Reinforcing steel shall be deformed billet-steel bars, welded steel wire or deformed welded steel wire conforming to ASTM A 615, A 185, or A 497.
 6. Joints shall be sealed with preformed joint sealing compound conforming to ASTM C 990.
 7. Shipping of components shall not be initiated until a minimum compressive strength of 4,000 psi is attained or five (5) calendar days after fabrication has expired, whichever occurs first.
- B. Internal Components and appurtenances shall conform to the following:
 1. Screen and support structure shall be manufactured of Type 316 and 316L stainless steel conforming to ASTM F 1267-01;
 2. Hardware shall be manufactured of Type 316 stainless steel conforming to ASTM A 320;
 3. Fiberglass components shall conform to the National Bureau of Standards PS-15 and coated with an isophalic polyester gelcoat;
 4. Access system(s) conform to the following:
 - a. Manhole castings shall be designed to withstand AASHTO H-20 loadings and manufactured of cast-iron conforming to ASTM A 48 Class 30.
- C. Removal Efficiencies
 1. The SWTD shall be capable of achieving an 80 percent average annual reduction for a particle distribution having a mean particle size (d_{50}) of 125 microns
 2. The SWTD shall be capable of capturing and retaining 100 percent of pollutants greater than or equal to 3/16 of an inch regardless of the pollutant's specific gravity (i.e.: floatable and neutrally buoyant materials) for flows up to the device's rated-treatment capacity. The SWTD shall be designed to retain all previously captured pollutants addressed by this subsection under all flow conditions.

3. The SWTD shall be capable of capturing and retaining total petroleum hydrocarbons. The SWTD shall be capable of achieving a removal efficiency of 92 and 78 percent when the device is operating at 25 and 50 percent of its rated-treatment capacity. These removal efficiencies shall be based on independent third-party research for influent oil concentrations representative of storm water runoff (20 ± 5 mg/L). The SWTD shall be greater than 99 percent effective in controlling dry-weather accidental oil spills.

D. Hydraulic Capacity

1. The SWTD shall provide a rated-treatment capacity of 0.7 cfs. At this rated-treatment capacity, the device shall be capable of achieving an 80 percent removal efficiency for a particle distribution having a mean particle size (d_{50}) of 125 microns. This removal efficiency shall be supported by independent third-party research.
2. The SWTD shall maintain the peak conveyance capacity of the drainage network as defined by the Engineer.

E. STORAGE CAPACITY

1. The SWTD shall be designed with a sump chamber for the storage of captured sediments and other negatively buoyant pollutants in between maintenance cycles. The minimum storage capacity provided by the sump chamber shall be 1.45 yd³. The boundaries of the sump chamber shall be limited to that which do not degrade the SWTD's treatment efficiency as captured pollutants accumulate. The sump chamber shall be separate from the treatment processing portion(s) of the SWTD to minimize the probability of fine particle re-suspension. In order to not restrict the Owner's ability to maintain the SWTD, the minimum dimension providing access from the ground surface to the sump chamber shall be 20 inches in diameter.
2. The SWTD shall be designed to capture and retain Total Petroleum Hydrocarbons generated by wet-weather flow and dry-weather gross spills. The minimum storage capacity provided by the SWTD shall be 92 gallons.

The manufacturer shall guarantee the SWTD components against all manufacturer originated defects in materials or workmanship for a period of twelve (12) months from the date the components are delivered to the owner for installation. The manufacturer shall upon its determination repair, correct or replace any manufacturer originated defects advised in writing to the manufacturer within the referenced warranty period. The use of SWTD components shall be limited to the application for which it was specifically designed.

The SWTD manufacturer shall submit to the Engineer a "Manufacturer's Performance Certification" certifying that each SWTD is capable of achieving the specified removal efficiencies listed in these specifications. The certification shall be supported by independent third-party research.

Subsection 637.01 shall be revised to include the following:

All components shall be subject to inspection by the Engineer at the place of manufacture and/or installation. All components are subject to rejected or identified for repair if the quality of materials and manufacturing do not comply with the requirements of this specification. Components which have been identified as defective may be subject for repair where final acceptance of the component is contingent on the discretion of the Engineer.

Subsection 637.02 and 637.03 shall be revised to include the following:

The Contractor shall exercise care in the storage and handling of the SWTD components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be born by the contractor.

Subsection 637.04 shall be revised to include the following:

The SWTD shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. The manufacturer shall provide the Contractor installation instructions and offer on-site guidance during the important stages of the installation as identified by the manufacturer at no additional expense. A minimum of 72 hours notice shall be provided to the manufacturer prior to their performance of the services included under this subsection.

1. The contractor shall fill all voids associated with lifting provisions provided by the manufacturer. These voids shall be filled with non-shrinking grout providing a finished surface consistent with adjacent surfaces. The contractor shall trim all protruding lifting provisions flush with the adjacent concrete surface in a manner, which leaves no sharp points or edges.
2. The contractor shall removal all loose material and pooling water from the SWTD prior to the transfer of operational responsibility to the Owner.

**REVISION OF SECTION 800
WORK ZONE TRAFFIC CONTROL**

Section 800 of the City of Colorado Springs Engineering Division Standard Specifications is hereby revised for this project as follows:

Subsection 801 shall be revised to include the following:

The Contractor shall submit Traffic Control Plans to the Engineer and receive the necessary approvals for each stage of work and the individual construction activities required to complete the project. The Contractor shall also obtain the necessary Work Zone Traffic Control permits from the City of Colorado Springs. All major changes to traffic control shall occur on Sunday mornings. The Contractor shall submit their requests for major traffic control shifts a minimum of 21 days prior to the scheduled traffic shift. This submittal shall include any construction details required to implement the traffic control. The Contractor must have approved Traffic Control Plans and the necessary permits before the related work commences.

The Contractor shall notify emergency services; city and school bus operations; all businesses located adjacent to the site and along Chestnut south to Fillmore Street; and any other groups designated by the City at least three (3) working days in advance of each planned construction traffic control setup or stage change. Record of these notices shall be provided to the Engineer prior to the start of this work.

Subsection 802 shall be revised to include the following:

This work also includes the temporary removal or modification of existing pavements and site features; the construction of temporary pavements to facilitate detours; and the removal of temporary pavements and complete restoration of affected areas of the site to better than original condition before the end of the project.

Subsection 804 shall be revised as follows:

Replace the first sentence of the first paragraph with the following: The Contractor shall coordinate with both the Engineer and the City Traffic Engineering Division to determine site-specific staging and/or phasing requirements.

Subsection 805.02 shall be revised to include the following:

Removal of Temporary Barriers, Temporary Devices, and Temporary Fencing shall have the following requirements:

At the time of the removal of the original culvert, temporary barriers, traffic devices and temporary fencing was installed to delineate the site limits. The barriers, traffic devices, and fencing, as indicated on the plans, shall be removed and salvaged. The Contractor shall avoid damaging the barriers, devices and fencing.

The Contractor shall deliver the barriers, traffic devices, and fencing to the City at a location designated by the Engineer.

Subsection 805.03.A shall be revised to include the following:

The requirements for the necessary permits and approvals from the City of Colorado Springs are contained in "The City of Colorado Springs Supplement to MUTCD for Traffic Controls for Street Construction, Utility Work, and Maintenance Operations", current edition.

If required, the Contractor shall revise and resubmit Traffic Control Plans to address the City Traffic Engineering Division review comments at no additional cost.

Subsection 805.03.D shall be added as follows:

The City of Colorado Springs will periodically field check the project Traffic Control. If the City feels that the traffic control is not adequate, they will require a review and re-approval of the Contractor's Traffic Control Plans. If a new submittal review and approval is required, all time delays and expenses incurred by the Contractor related to the additional requirements shall be the responsibility of the Contractor.

Subsection 805.06.B shall be revised to include the following:

All work and materials required to temporarily remove or modify existing pavements and site features; construct temporary asphalt pavements to facilitate detours; and remove temporary pavements and completely restore affected areas of the site shall be in accordance with all related and applicable sections of the City of Colorado Springs Engineering Division Standard Specifications, the CDOT Standard Specifications for Road and Bridge Construction, these project specifications, and the plans.

**REVISION OF PARKS SECTION 02751
CEMENT CONCRETE PAVEMENT**

Section 02751 of the City of Colorado Springs Parks, Recreation and Cultural Services Standard Specifications is hereby revised as follows:

Delete the section in its entirety and replace it with the following:

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes exterior cement concrete pavement for the following;
 - 1. Trail walkways and associated other flatwork.
- B. Related Sections include the following;
 - 1. Division 2 Section "Earthwork" for subgrade preparation, grading, and subbase course.
 - 2. Division 2 Section "Pavement for Joint Sealants" for joint sealants within concrete pavement and at isolation joints of concrete pavement with adjacent construction.

1.3 DEFINITIONS

- A. Cementitious Materials; Portland Cement shall conform to the specifications for Portland Cement 9ASTM C-150) and specifications for air-entrained Portland Cement (ASTM C-175 or C-595) and shall be Type IIA (Air-Entraining) cement, unless sulfate conditions allow otherwise. Table 2.2.3 in Chapter 2.2 of ACI 201 presents cement recommendations for sulfate resistances. In addition to the standard chemical requirements for Portland cement in ASTM C-150, the maximum percent of alkalis shall be as specified in Table 2 of ASTM C-150 for low alkali cement. Other types of cement or admixtures are only to be used upon approval by the Owner's Representative.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured material and product indicated.
- B. Design Mixes: For each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Samples: 10-lb sample of exposed aggregate.
- D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
- E. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements;
 - 1. Cementitious materials and aggregates.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Fiber reinforcement.
 - 4. Admixtures.
 - 5. Curing Compounds.
 - 6. Applied finish materials.
 - 7. Bonding agent or adhesive.
 - 8. Joint fillers.
- F. Minutes of pre-installation conference submitted by Contractor.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: an experienced installer who has completed pavement work similar in materials, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

- B. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.
 - 1. Manufacturer must be certified according to the National Ready Mix Concrete Association's Plant Certification Program.
- C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- D. Source Limitations: Obtain each type or class of cementitious Material of the same brand from the same manufacturer's plant and each aggregate from one source.
- E. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixes.
- G. Mockups: Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, and standard of workmanship.
 - 1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Owner's Representative.
 - 2. Notify Owner's Representative three days in advance of dates and times when mockups will be constructed.
 - 3. Obtain Owner's Representative approval of mockups before starting construction.
 - 4. Maintain approved mockups during construction in an undisturbed condition as a standard for judging the completed pavement.
 - 5. Demolish and remove approved mockups from the site when directed by Owner's Representative.
 - 6. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- H. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division I Section "Project Meetings."
 - 1. Before submitting design mixes, review concrete pavement mix design and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with concrete pavement to attend, including the following:
 - a. Contractor's superintendent.
 - b. Ready-mix concrete producer.
 - c. Concrete subcontractor.

1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

PART 2 – PRODUCTS

2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
 - 1. Use flexible or curved forms for curves of a radius 100 feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
- C. Forms for concrete shall be used for all vertical surfaces, mortar type, true to required lines and grades, and of sufficient strength to maintain shape during the placing of the concrete and the mechanical finishing without springing or settling. Wood forms shall be two inch (2") (nominal) surfaced plant; metal forms shall be approved section and shall have a flat surface on the top of not less than one and three-quarter inches (1-3/4"). Forms shall be thoroughly cleaned of all dirt, mortar, and foreign matter before being used. Unit lengths of forms shall be jointed in advance of the point of placing concrete. Flexible, curved or wood forms of the proper radii shall be used for curbs having a radius of less than One hundred feet (100'). All forms shall have dimensions of the City of Colorado Springs specified curb and gutter sections.

- D. Forms shall be equipped with not less than three (3) staking points per each ten feet (10') of length with means for securely locking the form to each stake. Flange braces and staking pockets shall extend outward on the base not less than two-thirds (2/3) of the height of the form. Forms that are bent, twisted, warped, broken, or forms that have battered or splintered top faces shall be removed from the job. Repaired forms shall not be used until they have been inspected and approved by the owner's Representative. The top and face of a form shall not vary from a true plane by more than one-fourth inch (1/4") in ten feet (10'). Forms shall be cleaned and oiled before concrete is placed against them. The alignment and grade of forms shall be checked and approved immediately before placing the concrete.

2.2 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Deformed-Steel Welded Wire Fabric: ASTM A 497, flat sheet.
- C. Epoxy-Coated Welded Wire Fabric: ASTM A 884/A 884M, Class A, plain steel.
- D. Reinforcement Bars: ASTM A 615/A 615M, Grade 60, deformed.
- E. Epoxy-Coated Reinforcement Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, deformed bars.
- F. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.
- G. Plain Steel Wire: ASTM A 82, as drawn.
- H. Epoxy-Coated Wire: ASTM A 884/A 884M, Class A coated, plain steel.
- I. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.
- J. Epoxy-Coated Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain steel bars.
- K. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
- L. Hook Bolts: ASTM A 307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- M. Bar Supports: Bolsters, chairs spacers, and other devices for spacing, supporting, and fastening reinforcement bars, welded wire fabric, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base materials will not support chair legs.
 - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer coated wire bar supports.
- N. Epoxy Repair Coating: Liquid two-part epoxy repair coating, compatible with epoxy coating on reinforcement.

2.3 CONCRETE MATERIALS

- A. The amounts and proportions of fine and coarse aggregates shall be such as to produce a plastic, workable mix which can be readily placed into the corners and angles of the forms and around reinforcement and other embedded fixtures without undue accumulation of water or laitance on the surface, and such that there will be no honeycombing in the structure. Proportions of fine and coarse aggregates shall be such that the ratio of the coarse to the fine aggregate shall not be less than one (1) nor more than two (2).
- B. If in the judgment of the Owner's Representative, based on laboratory tests, concrete aggregates from a given source are detrimentally reactive with alkalis in Portland Cement, they shall be used in concrete in combination with low-alkali cement only.
- C. Concrete aggregates shall consist of sand-gravel, gravel, crushed stone, or limestone; the particles shall be clean, hard, tough, durable, of uniform quality, free of any soft, thin, or elongated pieces, disintegrated stone, dirt, organic or other injurious materials occurring either free or as a coating. All aggregate must be supplied from a source approved by the Owner's Representative. Aggregate shall be made of the following sub sections:

- D. Fine Aggregate: Fine aggregate shall conform to ASTM C-33. Fine aggregate shall consist of sand or other inert materials, or combinations thereof approved by the Owner's Representative, and having hard, strong, durable particles, free from adherent coating. Fine aggregate shall be thoroughly washed to remove shale, coal, mica, clay, loam, alkali, organic matter or other deleterious matter.

1. Deleterious Substances. The amount of deleterious substances in the washed aggregate shall not exceed the following values:
 - a. Clay Lumps & Friable Particles, % by weight 3.0 MAX.
 - b. Coal & Lignite, % by weight 1.0 MAX.
 - c. Friable Particles, % by weight 1.0 MAX.
 - d. Sand Equivalent 75 MIN.
 - e. Fineness Modulus 2.3-3.1 MAX.
 - f. Sodium Sulfate Soundness, % by weight 10 MAX.
2. Grading. Fine aggregate shall be regularly graded from coarse to fine in two (2) sizes and when tested by means of the U.S. Standard, sieves shall conform to the following requirements expressed as percentages by weight:

Sieve Size or Test Procedure	Percent Passing or Test Requirement *(Concrete Sand)
3/8"	100
No. 4	95-00
No. 8	80-00
No. 16	50-85
No. 30	25-60
No. 50	5-30
No. 100	0-10
No. 200	**0-3

**The fine aggregate shall have not more than 45% passing any sieve and retained on the next consecutive sieve.

- E. Coarse Aggregate. Gravel and crushed stone shall conform to ASTM C-33. Coarse aggregate shall consist of gravel, crushed stone, or other inert material or combinations thereof approved by the Owner's Representative, and having hard, strong, durable pieces free from adherent coating. Coarse aggregate shall be thoroughly washed of clay, loam, bark, sticks, alkali, organic matter, shale, coal, mica, or other deleterious material.

1. Deleterious Substances. The amount of deleterious substances shall not exceed the following values:
 - a. Clay Lumps & Friable Particles, % by weight 3.0 MAX
 - b. Coal & Lignites, % by weight .5 MAX
 - c. Sum of Clay Lumps, Friable Particles and 5.0 MAX
 - d. Chert, % by weight 50 MAX
 - e. Abrasion, % by weight 50 MAX
 - f. Sodium Sulfate Soundness, % by weight 12 MAX

Wood waste is defined as all material which, after drying to constant weight, has a specific gravity less than 1.0.

2. Grading. Coarse aggregate, when tested in conformity with ASTM C-136 shall conform to one or more of the following gradings as called for elsewhere in the specifications, special provisions or on the plans.

Sieve size or Test Procedure	Percent Passing or Test Requirement		
	No. 357	No. 467	No. 57
2 1/2"	100	---	---
2"	95-100	100	---
1 1/2"	---	95-100	100
1"	35-70	---	95-100
3/4"	---	35-70	---
1/2"	10-30	---	25-60
3/8"	---	10-30	---
No. 4	0-5	0-5	0-10
No. 8	---	---	0-5
No. 200	*1.0 MAX	*1.0 MAX	*1.0 MAX

*1.5 MAX for crusher fines

NOTE: Size No. 67 may also be used on a case-by-case basis when approved by the Owner's Representative. The above values are in percentages by weight from AASHTO M-80 No. 357 and 467. Other gradations may be used when specified by the Owner's Representative.

- F. Concrete Strength. Concrete made from the coarse aggregate, graded to comply with the requirements of these specifications, combined with the specified proportions of cement and the fine aggregate proposed for use with the coarse aggregate shall develop a compressive strength at the age of 28 days of not less than 4000 psi.
- G. Water. Water used in concrete shall be potable, clean, and free from deleterious amounts of acids, alkalis, or any organic materials.
- H. Exposed Aggregate. Selected, hard, and durable; washed; free of material that reacts with cementitious material or causes staining; from a single source, with gap graded coarse aggregate as follows:
 - 1. Aggregate Sizes: 3/4 to 1 inch nominal.
 - 2. Aggregate Sizes: 1/2 to 3/4 inch nominal.
 - 3. Aggregate Sizes: 3/8 to 5/8 inch nominal.

2.4 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures. Calcium Chloride shall not be used as an antifreeze agent. Calcium Chloride as an accelerating agent in amounts not to exceed 1.5% by weight of cement may be used upon the approval of the Owner's Representative.
- B. Air-Entraining Admixture: ASTM C260.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
- E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.5 FIBER REINFORCEMENT

- A. Synthetic Fiber: Fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III 1/2 to 1-1/2 inches long.
- B. Synthetic Fiber: Fibrillated or monofilament polypropylene fibers engineered and designed for use in concrete payment, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long.
- C. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- D. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Fibrillated Fibers:
 - a. Fibrasol F; Axim Concrete Technologies.
 - b. Fibermesh; Fibermesh, Div. Of Synthetic Technologies.

- c. Forta; Forta Corporation.
- d. Grace Fibers: W.R. Grace & Co., Construction Products Div.
- 2. Monofilament Fibers:
 - a. Fibrasol IIP; Axim Concrete Technologies.
 - b. Fiberstrand 100; Euelid Chemical Co.
 - c. Fibermix Stealth; Fibermesh, Div. Of Synthetic Industries.
 - d. Forta Mono; Forta Corporation.
 - e. Grace MicroFiber; W.R. Grace & Co., Construction Products Div.
 - f. Polystrand 1000; Metalcrete Industries.

2.6 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. Dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.
- D. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

2.7 RELATED MATERIALS

- A. Expansion- and Isolation-Joint Filler Strips: ASTM D 1751, asphalt-saturated cellulose fiber.
- B. Coloring Agent: ASTM C979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis.
 - 1. Color: As indicated by manufacturer's designation.
 - 2. Color: Match Architect's sample.
 - 3. Color: As selected by Architect from manufacturer's full range.
- C. Pavement-Marking Paint: Latex, water-base emulsion; ready mixed; complying with FS TT-P-1952.
 - 1. Color: As indicated.
 - 2. Color: Blue for handicapped requirements, white elsewhere.
 - 3. Color: Blue for handicapped requirements, yellow for fire lanes, white elsewhere.
- D. Wheel Stops: Precast, air-entrained concrete; 2500-psi minimum compressive strength; approximately 6 inches high, 9 inches wide, and 84 inches long. Provide chamfered corners and drainage slots on underside, and provide holes for dowel-anchoring to substrate.
 - 1. Dowels: #4 rebar steel, minimum length 24 inches.
- E. Slip-Resistive Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of fused aluminum-oxide granules or crushed emery with emery aggregate containing not less than 50 percent aluminum oxide and not less than 25 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials.
- F. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- G. Chemical Surface Retarder: Water-soluble, liquid set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch.

2.8 CONCRETE MIXES

- A. Prepare design mixes, proportioned according to ACI211.1 and ACI301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
- B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the trial batch method.
 - 1. Do not use Owner's field quality-control testing agency as the independent testing agency.
- C. Proportion mixes to provide concrete with the following properties:
 - 1. Compressive Strength (28 days): 4000 psi.
 - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
 - 3. Slump Limit: 4 inches.
- D. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at a point of placement having an air content of 4 to 6 percent.

- E. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus or minus 1.5 percent..
- F. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.5 lb./cu. Yd.
- G. Coloring Agent: Add coloring agent to mix according to manufacturer's written instructions.

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with requirements and with ASTM C94.

Specified Compressive Strength at 28 Days 4000 psi	Maximum Water/Cement Ratio by Weight 0.45
Minimum Cement Content per Cubic Yard of Concrete 564 lbs.	

The proportioning of aggregate to cement shall be such as to produce a good workable mix and the slump shall be a maximum of four inches (4") as per ASTM C-143. The equipment for batching of the aggregates, cement, water, and air-entraining agent shall be such that accurate control can be held over the various constituents.

- B. Ready-mixed concrete shall comply with ASTM C-94 for ready-mixed concrete and the following specifications:
- C. Time of Haul: Concrete transportation in truck mixers or truck agitators shall be delivered to the site of work and completely discharged within a period of ninety (90) minutes after the cement comes in contact with the mixing water or with the combined aggregates when the combined aggregates contain free moisture in excess of 2% by weight. If hot weather exists causing the temperature of the concrete to rise above 90 degrees Fahrenheit, then the time of haul shall be within a period of sixty (60) minutes.
- D. Production and Delivery: The production and the delivery of ready-mixed concrete shall be such that placing and finishing shall be continuous in so far as the operations require.
- E. Testing of Concrete: Samples for test cylinders should be taken not less than once each day or not less than each 50 cubic yards of concrete placed. This requirement applies to both reinforced and reinforced concrete work unless otherwise directed by the Owner's Representative. For structural elements, the Owner's Representative may call for additional samples for strength testing.
- F. A minimum of four cylinders shall be prepared for each sample of concrete. Once cylinder shall be strength tested after 7 days of curing time. Two cylinders shall be strength tested after 28 days of curing time.
- G. In the event the initial 28 day cylinder should fail, the remaining two cylinders should be strength tested after 45 days of curing time.
- H. Samples for slump and air-content testing should be taken for each truck delivery or not less than each 12 cubic yards where site batching is performed. The Owner's Representative may vary the frequency of sampling and testing depending on site conditions. The preparation, handling, storage and testing procedures of all samples shall be in conformance with the applicable ASTM and AASHTO standards.
 - 1. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added.

PART 3 – EXECUTION**3.1 PREPARATION**

- A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.
- B. Remove loose material from compacted subbase surface immediately before placing concrete.
- C. Before any concrete is placed, all equipment for mixing and transporting the concrete shall be cleaned. All debris and ice shall be removed from the places to be occupied by the concrete. Forms shall be thoroughly oiled. Water shall be removed from the place of deposit before concrete is placed. Newly placed concrete shall be protected from any water damage. The top six (6) inches of the bedding or subgrade shall be graded and compacted to a minimum density of 90% ASTM D-1557 prior to placement of the concrete.
- D. When concrete placed on earth surfaces is necessary, the surfaces shall be free from frost, ice, mud and water. Concrete shall be conveyed from the mixer to the place of final deposit by methods which will prevent the separation or loss of materials. Concrete shall not be free dropped from more than four (4) feet.
- E. Equipment for tremming, chuting, pumping, and pneumatically conveying concrete shall be of such size and design as to insure a practically continuous flow of concrete at the delivery end without separation of materials.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.

3.3 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

3.4 JOINTS

- A. General: Construct construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
 - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour, unless pavement terminates at isolation joints.
 - 1. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
 - 2. Provide tie bars at sides of pavement strips where indicated.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

1. Locate expansion joints below concrete headwalls at the end of the structure. However, spacing of expansion joints shall not be greater than 100 feet.
 2. Extend joint fillers full width and depth of joint.
 3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
 4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Install dowel bars and support assemblies at joints where indicated. Use 5/8 inch cardboard tube or PVC. Lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Contraction Control Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to a least one fourth of the concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after floating by grooving and finishing each edge of joint with groover tool to the following radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 - a. Radius: 1/2 inch
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8 inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks. Within 24 hours of initial pour.
- F. Edging: Tool edges of pavement, gutters, curbs and joints in concrete after initial floating with an edging tool to the following radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.
1. Radius: 1/2 inch

3.5 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work. Owner's Representative needs to be notified 24 hours to inspect forms prior to pouring concrete.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.
- D. Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery, at Project site, or during placement.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI309R.
1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- H. Expansion joints shall be 1/2 inch premolded felt expansion joint material and shall be placed every 100 feet both ways unless otherwise indicated on drawings.
- I. Control joints shall 1 1/2" in depth and shall be placed every five feet (5') each way unless otherwise indicated on drawings.
- J. Base course is to be placed if indicated on drawings and is to be 3/8 +/- crusher waste or gravel to Standard Class 6.

- K. All sleeving under concrete surfaces shall be stamped into surfaced with an "S" on each end of the sleeve.
- L. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading dry-shake surfaces treatments.
- M. Curbs and Gutters. When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.
- N. Slip-Form Pavers: When automatic machine placement is used for pavement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce pavement to required thickness, lines, grades, finishes, and jointing as required for formed pavement.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of paver machine during operations.
- O. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength.
- P. Cold-Weather Placement: Comply with ACI306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. Concrete shall not be placed in cold weather unless the ambient temperature has reached 40 degrees Fahrenheit at 9:00 a.m., and the temperature is rising. Cold weather protection blankets, etc. will be required for five days after concrete has been placed. Uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F and not more than 80 deg F at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- Q. Hot-Weather Placement: Place concrete according to recommendations in ACI305R and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover reinforcement steel with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, reinforcement steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 CONCRETE FINISHING

- A. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots, and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture. Or as otherwise indicated on drawings.

3.7 SPECIAL FINISHES

- A. Monolithic Exposed Aggregate Finish: Expose coarse aggregate to pavement surfaces as follows:
 - 1. Immediately after floating, spray-apply chemical surface retarder to pavement according to manufacturer's written instructions.

2. Cover with plastic sheeting, scaling laps with tape, and remove when ready to continue finishing operations.
 3. Without dislodging aggregate, remove excess mortar by lightly brushing surface with a stiff, nylon bristle broom.
 4. Fine-spray surface with water and brush. Repeat water flushing and brushing cycle until cement film is removed from aggregate surfaces to depth required.
- B. Slip-Resistant Aggregate Finish: Before final floating, apply slip-resistant aggregate finish to pavement surfaces according to manufacturer's written instructions and as follows.
1. Uniformly spread 25 lb/100 sq. ft. of dampened non slip aggregate over the surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface.
 2. After curing, lightly work surface with a steel wire brush or an abrasive stone, and water to expose non slip aggregate.
- C. Colored Dry-Shake Hardener Finish: After initial floating, apply colored dry-shake materials to pavement surfaces according to manufacturer's written instructions and as follows:
1. Uniformly apply colored dry-shake materials at a rate of 100 lb/100 sq. ft. unless greater amount is recommended by manufacturer to match pavement color required.
 2. Uniformly distribute approximately two-thirds of colored dry-shake material over the concrete surface with mechanical spreader, and embed by power floating. Follow power floating with a second shake application, uniformly distributing remainder of dry-shake material to ensure uniform color, and embed by power floating.
 3. After final floating, apply a hand-trowel finish followed by a broom finish to concrete. Cure concrete with curing compound recommended by dry-shake material manufacturer. Apply curing compound immediately after final finishing.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI306.1 for cold-weather protection and follow recommendations in ACI305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft x h before and during finishing operations. Apply according to manufacture's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination to these as follows:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.9 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
1. Elevation: 1/4 inch
 2. Thickness: Plus 3/8 inch minus 1/4 inch.
 3. Surface: Gap below 10-foot-long, unlevelled straightedge not to exceed 1/4 inch.

4. Lateral Alignment and Spacing of Tie Bars and Dowels; 1 inch.
5. Vertical Alignment of Tie-Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Contraction Joint Dept: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.10 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Owner's Representative.
- B. Allow concrete pavement to cure for 28 days and be dry before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.11 WHEEL STOPS

- A. Securely attach wheel stops into pavement with #4 rebar steel, minimum length 24 inches.

3.12 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.
- B. Testing Services: Testing shall be performed according to the following requirements:
 1. Sampling Fresh Concrete: Representative samples of fresh concrete shall be obtained according to ASTM C172, except modified for slump to comply with ASTM C94.
 2. Slump: ASTM C 143; one test at point of placement for each compressive-strength test, but not less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
 3. Air Content: ASTM C231, pressure method; one test for each compressive-strength test, but not less than one test for each day's pour of each type of air-entrained concrete.
 4. Concrete Temperature: ASTM C1064; one test hourly when air temperature is 40 degrees F and below and 80 degrees F and above, and one test for each set of compressive-strength specimens.
 5. Compression Test Specimens: ASTM C31/C 31M; one set of four standard cylinders for each compressive-strength test, unless otherwise indicated. Cylinders shall be molded and stored for laboratory-cured test specimens unless field-cured test specimens are required.
 6. Compressive-Strength Tests: ASTM C39; one set for each day's pour of each concrete class exceeding 5 cu. Yd, but less than 25 cu. Yd., plus one set for each additional 50 cu. Yd. One specimen shall be tested at 7 days and two specimens at 28 days; one specimen shall be retained in reserve for later testing if required.
 7. When frequency of testing will provide fewer than five compressive-strength tests for a given class of concrete, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
 8. When total quantity of a given class of concrete is less than 50 cu. yd. Owner's Representative may waive compressive-strength testing if adequate evidence of satisfactory strength is provided.
 9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, current operations shall be evaluated and corrective procedures shall be provided for protecting and curing in-place concrete.
 10. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive compressive-strength test results equal or exceed specified compressive strength and no individual compressive-strength test result falls below specified compressive-strength by more than 500 psi.

- C. Test results shall be reported in writing to Owner's Representative, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in pavement, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7- and 14- day tests.
- D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Owner's Representative but will not be used as the sole basis for approval or rejection.
- E. Additional Tests: Testing agency shall make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Owner's Representative. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3.13 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section. Contractor is required to repair or replace any defects that occur during the contract period as set forth in the contract documents. To include but not limited to the following:
- B. Work showing, a patch, chips or other cracking appearance or other finish blemishes or apparent "lap" marks of improper troweling will be rejected, removed and replaced at the Contractor's expense.
- C. The Contractor shall erect barricades, snow fencing, or take appropriate measures to totally protect concrete until it has thoroughly hardened. Any area marked or defaced in any manner shall be removed to the nearest expansion or contraction joint and be replaced at no additional costs to the Owner.
- D. No patched or cover materials will be accepted on a new pour, to hide any defects in original surface. Only with prior approval from Owner's Representative.
 - 1. Spauling.
 - 2. Cracking over 1/8" wide.
 - 3. Any settling greater than 3/4", that would cause uneven surfaces will be replaced.
- E. Drill test cores where directed by Owner's Representative when necessary to determine magnitude of cracks of defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.
- F. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- G. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 02751 – CEMENT CONCRETE PAVEMENT

**REVISION OF PARKS SECTION 02920
SEEDING AND SODDING**

Section 02920 of the City of Colorado Springs Parks, Recreation and Cultural Services Standard Specifications is hereby revised as follows:

Delete the section in its entirety and replace it with the following:

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Seeding.
 - 2. Sodding.
 - 3. Plugging.
 - 4. Meadow grasses and wildflowers.
 - 5. Sod renovation.
- B. Related Sections include the following:
 - 1. Division 2 Section "Site Clearing" for topsoil stripping and stockpiling.
 - 2. Division 2 Section "Earthwork" for excavation, filling and backfilling, and rough grading.
 - 3. Division 2 Section "Subdrainage" for subsurface drainage.

1.3 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
 - 1. Certification of each seed mixture for turf grass sod, identifying source, including name and telephone number of supplier.
- C. Product Certificates: For soil amendments and fertilizers, signed by product manufacturer.
- D. Qualification Data: For landscape installer.
- E. Material Test Reports: For existing surface soil and imported topsoil
- F. Maintenance Instructions: Upon completion of all sodding operations, the Contractor shall notify the Owner's Representative to inspect the work. Upon inspection, if all work is acceptable, the Owner's Representative shall record that date and shall issue a "Conditional Acceptance" letter which shall state that the Contractor shall maintain all sodded areas as specified according to the following length of time. As indicated in section 1.8.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: All work specified herein shall be performed under the direct supervision of a Superintendent thoroughly familiar with the work of this section who shall be at the project site for the duration of the work in this section.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
 - B. Installer Qualifications: All work specified herein shall be performed under the direct supervision of a Superintendent thoroughly familiar with the work of this section who shall be at the project site for the duration of the work in this section.
 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
 - C. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
 - D. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant-nutrient content of topsoil.
 1. Report suitability of topsoil for Sod growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
 - E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."
- 1.6 DELIVER, STORAGE, AND HANDLING**
- A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.
 - B. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding."
- 1.7 SCHEDULING**
- A. Planting Restrictions: Plant during one of the following periods unless otherwise approved by Owner's Representative. Coordinate plating periods with maintenance periods to provide required maintenance from date of Substantial Completion.
 1. Sodding: April 15th-October 15th.
 2. Seeding: March 1st-September 15th.
 3. Irrigated Native Seeding: March 1st-September 15th.
 4. Non Irrigated Native Seeding: November 1st-May 15th.
 - B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit. No sodding shall take place when the site is wet or during freezing temperatures.
- 1.8 TURF MAINTENANCE**
- A. Begin maintenance immediately after each area is planted and continue until acceptable Sod is established, but for not less than the following periods:
 1. Seeded Turf: 60 days from date of Substantial Completion.
 2. Native Seeding: 60 days from date of Substantial Completion.
 3. Sodded Turf: 30 days from date of Substantial Completion.
 - B. A period of 30 calendar days minimum, which shall be referred to as the "Sod Maintenance Period." At the end of this period, the sodded areas shall be given "Final Acceptance" if the sod is in a healthy condition and of a normal green color, with no bare areas larger than six (6) square inches. Mowing of sod should occur (3) days before "Final Acceptance." If sod is installed in late October, a "Final Acceptance" for sod will not be issued, until the following spring.
 - C. At the end of the maintenance period, the Owner's Representative shall, within five (5) calendar days, inspect the work, and if the work is acceptable, he shall issue a Final Acceptance Sod Work" letter which shall relieve the Contractor from further obligations for Sod work only. Final acceptance of Sod work may be given independently of final acceptance of all work under this contract.
 - D. The maintenance period for this work shall begin immediately after each area is sodded and shall continue in accordance with the following requirements:

1. Minor vandalism or other damage to the sodded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major vandalism or damage caused by others through no fault of the Contractor or his subcontractor shall be brought to the attention of the Owner's Representative who will be the sole judge as to the extent of such damage. If such damage is deemed to be major by the Owner's Representative, any work necessary to repair the seeded or sodded area to an acceptable condition shall be paid for by the Owner under the provisions of "extra work" stated in the General Conditions, if such work is authorized by the Owner's Representative.
2. Acts of God: Minor damage to the sodded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major damage caused by flood, hail, storm, wind, or large rain storm, and through no fault of the Contractor to protect his work, shall immediately be brought to the attention of the Owner's Representative who will be the sole judge as to the extent of such damage. Major damage shall be repaired by the Contractor and paid for by the Owner, if such work is authorized by the Owner's Representative.
 - a. When full maintenance period has not elapsed before end of planting season, or is Sod is not fully established, continue maintenance during next planting season.
- E. Maintain and establish Sod by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Rolls, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth turf.
 1. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch. Anchor as required to prevent displacement.
- F. Watering: Provide and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep Sod uniformly moist.
 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 2. Water Sod at a minimum rate of 1 1/2" to 2" per week.
- G. The Contractor shall be responsible for watering and mowing of the sodded areas only until Final Acceptance. The bluegrass sod shall be maintained at a height of three inches (3") and of four inches (4"). If grass exceeds four inches (4") in height before mowing, no more than (1/3) of top growth shall be cut off at anyone time. All clippings shall be removed from site. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowing to maintain consistent grass height. Sufficient water shall be applied during the maintenance period to maintain the sod in a healthy condition, allowing it to knit together and develop a deep root system. Care should be given to avoid standing surface water, or erosion from over watering. Failure of the irrigation system shall not relieve the Contractor from applying water required during this period.

1.9 NATIVE SEEDING MAINTENANCE

- A. Begin maintenance immediately after each area is planted and continue until acceptable meadow is established, but for not less than 60 days from date of Substantial Completion. The maintenance period for this work shall begin immediately after all areas are seeded and shall continue in accordance with the following requirements:
 1. All seeded areas shall have suitable signs erected at important points, notifying the public to keep off.
- B. Minor vandalism or other damage to the seeded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major vandalism or damage caused by others through no fault of the Contractor or his subcontractor shall be brought to the attention of the Owner's Representative who will be the sole judge as to the extent of such damage. If such damage is deemed to be major by the Owner's Representative, any work necessary to repair the seeded area to an acceptable condition shall be paid for by the Owner under the provision of "extra work" stated in the General Conditions, if such work is authorized by the Owner's Representative.
- C. Acts of God: Minor damage to the seeded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major damage caused by flood, hail storm, wind or large rain storm, and through no fault of the Contractor to protect

his work, shall immediately be brought to the attention of the Owner's Representative who will be the site judge as to the extent of such damage. Major damage shall be repaired by the Contractor and paid for by the Owner under the provisions of City of Colorado Springs Engineering Division Standard Specifications Section 100.23 "Changed Conditions", if such work is authorized by the Owner's Representative.

- D. The Contractor shall be responsible for watering and mowing the seeded areas only until final Acceptance. Mowing shall be conducted at a maximum of six inches (6"), and mowed down to four inches (4").
- E. Upon completion of all seeding operations, the Contractor will notify the Owner's Representative to inspect the work. Upon inspection, if all work is acceptable, the Owner's Representative shall record that date and shall issue a "Conditional Acceptance" letter which shall state that the Contractor shall maintain all seeded areas as specified according to the following length of time.
- F. Period of 60 calendar days minimum, which shall be referred to as the "Seeded Area Maintenance Period". AT the end of this period, the seeded areas shall be given "Final Acceptance" if the seed has germinated and there are no bare areas larger than six (6) square inches in diameter shall be re-seeded. AT the end of the maintenance period, the Owner's Representative shall, within five (5) calendar days, inspect the work, and if the work is acceptable, he shall relieve the Contractor from further obligations for seeding work only. Final acceptance of seeding work may be given independently of final acceptance of all work under this contract.
- G. Maintain and establish meadow by watering, weeding, mowing, trimming, replanting, and other operations. Roll, regrade and replant bare or eroded areas and remulch.
- H. Watering: Provide and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep meadow uniformly moist.
 - 1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
 - 2. Water meadow at a minimum rate of 1/2 inch per week for 8 weeks after planting

PART 2 - PRODUCTS

2.1 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species: State-certified seed of grass species, as follows:
Native Grass Seed Mix – Foothills Mix (All seeding rates are in pounds of Pure Live Seed (PLS) per acre).

Common Name	Scientific Name	lbs PLS/acre
Annual Ryegrass	<i>Lolium multiflorum</i> Lamarck	5.0
Slender Wheatgrass	<i>Elymus trachycaulus</i>	3.75
Mountain Brome	<i>Bromus marginatus</i>	2.5
Pubescent Wheatgrass	<i>Agropyron trichophorum</i>	2.5
Hard Fescue	<i>Festuca brevipila</i>	2.5
Canada Bluegrass	<i>Poa compressa</i>	2.5
Indian grass	<i>Sorghastrum nutans</i>	2.0
Sideoats Grama	<i>Bouteloua curtipendula</i>	1.75
Blue Grama	<i>Bouteloua gracilis</i>	1.25
Switchgrass	<i>Panicum virgatum</i>	1.25
TOTAL PLS PER ACRE		25

- C. Seed Species: As specified on drawings.

2.2 TURFGRASS SOD

- A. Turfgrass Sod: Blended Kentucky Bluegrass.

2.3 NATIVE GRASSES AND WILDFLOWERS

- A. Wildflower Seed: Fresh, clean, dry, new seed, mixed species as follows:
- B. Native Grass Seed: Fresh, clean, dry, new seed, mixed species as follows:
- C. Wildflower and Native Grass Seed: Fresh, clean, dry, new seed, mixed species as follows:
- D. Seed Carrier: Inert material, sharp clean sand or perlite, mixed with seed at a ratio of not less than two parts seed carrier to one part seed.

2.4 TOPSOIL

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 4-percent organic material content; free of stones 3/4 inch or larger in any dimension and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source: Reuse surface soil stockpiled on-site. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
 - 2. Topsoil Source: Import topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural land, bogs or marshes.
 - 3. Topsoil Source: Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.

2.5 ORGANIC SOIL AMENDMENTS

- A. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through **1-inch** sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - 1. Organic Matter Content: 50 percent of dry weight.
 - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated compostable mixed solid waste.
- B. Peat: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.
- C. Peat: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil or toxic materials.
 - 1. In lieu of decomposed wood derivatives, mix partially decomposed wood derivatives with at least 0.15 lb. of ammonium nitrate or 0.25 lb. of ammonium sulfate per cubic foot of loose sawdust or ground bark.
- E. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.

2.6 PLANTING ACCESSORIES

- A. Selective herbicides: EPA registered and approved, of type recommended by manufacturer for application.

2.7 FERTILIZER

- A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.
- B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of ureaformaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition: 1 lb/1000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

- C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 30 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition: 25 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - 2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.8 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew-and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Peat Mulch: Sphagnum peat moss, partially decomposed, finely divided or granular texture, with a pH range of 3.4 to 4.8.
- C. Peat Mulch: Finely divided or granular texture, with a pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water-absorbing capacity of 1100 to 2000 percent.
- D. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 5 to 10 decisiemens/m; not to exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - 1. Organic Matter Content: **50** percent of dry weight.
 - 2. Feedstock: Agricultural, food, or industrial residuals; biosolids; yard trimmings; or source-separated or compostable mixed solid waste.
- E. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with a maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.
- F. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application; nontoxic and free of plant-growth or germination inhibitors.
- G. Asphalt Emulsion: ASTM D 977, Grade SS-1; nontoxic and free of plant-growth or germination inhibitors.

2.9 EROSION-CONTROL MATERIALS

- A. Erosion-Control Blankets: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, 6 inches long.
- B. Erosion-Control Fiber Mesh: Biodegradable twisted jute or spun-coir mesh, a minimum of 0.92 lb./sq. yd., with 50 to 65 percent open area. Include manufacturer's recommended steel wire staples, 6 inches long.

2.10 PLANTING SOIL MIX

- A. Planting Soil Mix: As specified on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive Turf and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations. Reference tree planting schematic for exclusion of sod within tree planting well.
 - 1. Protect adjacent and adjoining areas from hydroseeding overspray.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Stop all sod at the edge of the tree well.

3.3 SOD PREPARATION

- A. Limit Sod subgrade preparation to areas to be planted within forty eight hours. Installation of sod shall not be undertaken until adjacent site improvements and pavement is complete. No trucking or moving of equipment or materials will be permitted upon completed sod.
- B. All irrigation heads, valve boxers, drain valves and quick couplers shall be flagged prior to sodding operations.
- C. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than $\frac{3}{4}$ inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply fertilizer directly to finish grade, prior to sodding.
 - 2. Thoroughly blend planting soil mix before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
 - a. Delay mixing fertilizer with planting soil if planting will not proceed within three days.
 - 3. Spread planting soil mix to a depth of 4 inches, but not less than required to meet finish grades natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
 - a. Spread approximately one-half the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil mix.
- D. Unchanged Subgrades: If Turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:
 - 1. Remove existing grass, vegetation, and turf. Do not mix into surface soil.
 - 2. Loosen surface soil to a depth of at least of 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 4 inches of soil. Till soil to a homogeneous mixture of fine texture.
 - a. Apply fertilizer directly to finish grade, prior to sodding.
 - 3. Remove stones larger than $\frac{3}{4}$ inches in any dimension and sticks, roots, trash, and other extraneous matter.
 - 4. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.
- E. Finish Grading: Finished grading and preparation of the entire sodded or seeded bed areas shall be achieved by disc-harrow or other approved method to a depth of six-inches (6"), or determined by Owner's Representative), fine ranking and/or light dragging until the surface is smooth, friable, and of uniform fine texture and compaction, having no lumps or stones over $\frac{3}{4}$ " inch. No sod shall be laid on any area which has not been so prepared. Obtain the Owner's Representative's approval of prepared areas prior to sodding. A depth of one-inch (1") shall be maintained along sidewalk, before sod is installed.
- F. Finish grades shall be as indicated on the drawing, subject to minor adjustments, as may be directed by the Owner's Representative. Tops and toes of slopes shall be rounded, and the necessary swales for the run-off of surface water shall be carefully maintained with sufficient slope.
- G. Moisten prepared Sod areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- H. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

3.4 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 1. Do not use wet seed or seed that is moldy or otherwise damaged.
- B. Sow seed at the rate: As specified on drawings.
- C. Rake seed lightly into top $\frac{1}{4}$ inch topsoil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes exceeding 3:1 or greater with erosion-control blankets installed and stapled according to manufacturer's written instructions.
- E. Protect seeded areas with slopes not exceeding 3:1 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.

1. Anchor straw mulch by crimping into topsoil with suitable mechanical equipment.
2. Bond straw mulch by spraying with asphalt emulsion at the rate of 10 to 13 gal. /1000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or strained areas.

3.5 HYDROSEEDING

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.
 1. Mix slurry with non-asphaltic tackifier.
 2. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply mulch at a minimum rate of 1500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.
 3. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry application at a minimum rate of 500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb. /acre.

3.6 SODDING

- A. Laying Sod: Lay sod within 24 hours of harvesting. Sod shall be laid on a firm moist bed with tight joints so that no voids occur under or between strips. All ends should be tucked and unrolled. Stagger sod strips or pads to offset joints in adjacent courses. Avoid damage to subgrade or sod during installation. Any depressions or mounds occurring after sodding shall be corrected prior to acceptance of work. No sod shall be laid on a frozen bed or installed on Fridays. No sod shall be laid within the tree planting well.
- B. Sod shall be blended Kentucky Bluegrass turf, approved by owner and supplied from a single approved source. Sod shall be one inch (1") minimum thick dense and free of weeds and stones. All sod shall be inspected and approved by the Owner's Representative at the time of delivery. Sod shall be sufficiently moist so that the soil will adhere to the roots when handled. Delivered sod shall contain no more than five (5) percent broken rolls. Sod that has become moldy, withered, or yellow from storage or drying, or does not meet minimum thickness requirements may be rejected at the time of planting. Sod out for more than 24 hours from the time of cutting shall not be used.
- C. As soon as sod has been laid, it shall be watered and rolled using a Jackson Sod Roller, True Temper Model 12LR with 240# of water approved equals, so that the sod makes a tight bond to the sod bed. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.
 1. Lay sod across angle of slopes exceeding 3:1.
 2. Anchor sod on slopes exceeding 4:1 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.
- D. Saturate sod with fine water spray within two hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.7 SOD RENOVATION

- A. Renovate existing sod damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
 1. Re-establish sod where settlement or washouts occur or where minor regrading is required.
- B. Remove sod and vegetation from diseased or unsatisfactory sod areas: do not bury in soil.
- C. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.
- D. Mow, dethatch, core aerate, and rake existing turf.
- E. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.

- F. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of them off Owner's property.
- G. Till ripped, bare and compacted areas thoroughly to a soil depth of 6 inches.
- H. Apply soil amendments and initial fertilizers required for establishing new Turf and mix thoroughly into top 4 inches of existing soil. Provide new planting soil to fill low spots and meet finish grades.
- I. Apply sod as required for new Turf.
- J. Water newly planted areas and keep moist until new sod is established.

3.8 SATISFACTORY TURF

- A. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities. The maintenance period for this work shall begin immediately after all areas are seeded and shall continue in accordance with the following requirements.
- B. All seeded areas shall have suitable signs erected at important points, notifying the public to keep off. Minor vandalism or other damage to the seeded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major vandalism or damage caused by others through no fault of the Contractor or his subcontractor shall be brought to the attention of the Owner's Representative who will be the sole judge as the extent of such damage. If such damage is deemed to be major by the Owner's Representative, any work necessary to repair the seeded area to an acceptable condition shall be paid for by the Owner under the provision of "extra work" stated in the General Conditions, if such work is authorized by the Owner's Representative.
- C. Acts of God: Minor damage to the seeded areas shall be the responsibility of the Contractor until all work receives Final Acceptance by the Owner's Representative. Major damage caused by flood, hail storm, wind or large rain storm, and through no fault of the Contractor to protect his work, shall immediately be brought to the attention of the Owner's Representative who will be the sole judge as to the extent of such damage. Major damage shall be repaired by the Contractor and paid for by the Owner, if such work is authorized by the Owner's Representative.
- D. The Contractor shall be responsible for watering and mowing the seeded areas only until Final Acceptance. Mowing shall be maintained at a height of three inches (3") and mowed only by equipment with sharp blades. Sod shall be mowed before grass reaches a height of four inches (4"). If grass exceeds four inches (4"). If grass exceeds four inches (4") in height before mowing, no more than (1/3) of top growth shall be cut off at any one time.
- E. Upon completion of all seeding operations, the Contractor will notify the Owner's Representative to inspect the work. Upon inspection, if all work is acceptable, the Owner's Representative shall record that date and shall issue a "Conditional Acceptance" letter which shall state that the Contractor shall maintain all seeded areas as specified according to the following length of time.
- F. Period of 60 calendar days minimum, which shall be referred to as the "Seeded Area Maintenance Period". At the end of this period, the seeded areas shall be given "Final Acceptance" if the seed has germinated and there are no bare areas larger than six (6) square inches. All bare areas larger than (6) square inches in diameter shall be re-seeded.
 - 1. At the end of the maintenance period, the Owner's Representative shall, within five (5) calendar days, inspect the work, and if the work is acceptable, he shall relieve the Contractor from further obligations for seeding work only. Final acceptance of seeding work may be given independently of final acceptance of all work under this contract.
- G. Satisfactory Sodded Turf: At the end of maintenance period, a healthy, well-rooted, even-colored, viable Sod has been established, free of weeds, open joints, bare areas, and surface irregularities.
- H. Re-establish Turf that does not comply with requirements and continue maintenance until Turf are satisfactory.

3.9 NATIVE SEEDING

- A. Method of Application: Refer to Detail Supplement or drawings.
- B. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 1. Do not use wet seed or seed that is moldy or otherwise damaged.

- C. Sowing rates vary with mix of species but are usually much lighter than turfgrass seed application rates. Revise to suit Project.
- D. Sow seed at the net rate of 6 oz. /1000 sq. ft.
- E. Brush seed into top 1/16 inch of topsoil, roll lightly, and water with fine spray.
- F. Protect seeded areas from hot, dry weather or drying winds by applying compost mulch within 24 hours after completing seeding operations. Soak and scatter uniformly to a depth of 3/16 inch and roll to a smooth surface.
- G. Water newly planted areas and keep moist until meadow is established.

3.10 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by Sod work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after Sod is established. Remove Erosion-control measures after grass establishment period.

END OF SECTION 02920 – SEEDING AND SODDING

B. Revision to Colorado Springs Utilities Standard Specifications

The Standard Specifications for water line construction and protection shall be the “**Colorado Springs Water Line Extension and Service Standards**”, revised 2014, for steel water line construction shall be supplemented with the following:.

Section 09 90 05 Polyurethane Coating

Section 26 42 13 Passive Cathodic Protection for Underground and Submerged Piping

Section 33 05 01.01 Welded Steel Pipe and Fittings

Measurement and Payment for all bid items shall be in accordance with Section H, Measurement and Payment, and shall take precedence over the measurement and payment sections of the Standard Specifications or revisions thereof.

**SECTION 09 90 05
POLYURETHANECOATING**

The Colorado Springs Utilities Water Line Extension and Service Standards are hereby revised and supplemented as follows:

Add the following:

**SECTION 09 90 05
POLYURETHANECOATING**

PART 1 GENERAL

1.1 REQUIREMENT

- A. The Work of this section includes the materials, installation, and testing of a polyurethane pipe coating system.
- B. Except as described in this section, the coating system shall be in accordance with ANSI/AWWA C222 for straight pipe sections and fittings and ANSI/AWWA C216 for specials and field joints.

1.2 REFERENCES

- A. Commercial Standards:
 - 1. AWWA C216, Heat-Shrinkable, Cross-Linked Polyolefin Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.
 - 2. AWWA C217, Petrolatum and Petroleum Wax Tape Coatings for the Exterior of Connections and Fittings for Steel Water Pipelines.
 - 3. AWWA C222, Polyurethane Coatings for Interior and Exterior of Steel Water Pipe and Fittings.
 - 4. AWWA C604, Installation of Steel Water Pipe 4-inches and Larger.
 - 5. ASTM D4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - 6. NACE SP-0188, Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
 - 7. Society for Protective Coatings (SSPC):
 - a. SP-1, Solvent Cleaning Surface Preparation.
 - b. SP-2, Hand Tool Cleaning Surface Preparation.
 - c. SP-3, Power Tool Cleaning Surface Preparation.
 - d. SP-6, Commercial Abrasive Blast Surface Preparation.
 - e. SP-10, Near White Metal Abrasive Blast Surface Preparation.

1.3 SUBMITTALS

- A. Make submittals in accordance with Section 01 33 00, Submittal Procedures.
- B. Action Submittals:
 - 1. Provide the following coating manufacturer certifications:
 - a. Shop applied coating system applicator is an approved applicator.
 - b. Shop applied coating system applicator's equipment meets the requirements for material mixing, temperature control, application rate, and ratio control for multi-part coatings.
 - c. Shop applied coating system applicator's personnel are trained by the coating manufacture in the application and use of equipment for the

- coating material being applied. Identify the shop applied coating system applicator personnel certified by the coating manufacturer.
2. Provide certification of training from the heat shrink sleeve coating manufacturer or steel pipe manufacturer for exterior field coating of pipe joint applicators. Provide list of certified personnel proposed to be utilized on this project. Certification shall be effective within 12 months of starting the exterior field coating application.
3. Submit catalog cuts and other manufacturer's information for materials provided on a system-by-system basis.
4. Furnish a Material Safety Data Sheet (MSDS), the manufacturer's technical data sheets, and paint colors available (where applicable) for each product used in coating system.
5. Technical and performance information that demonstrate coating system materials compliance with Specification.
6. Provide to the ENGINEER a copy of the manufacturer's coating application quality assurance manual prior to beginning coating application.

1.4 QUALITY ASSURANCE

- A. Shop Applied Coating System Applicator's Experience and Certification: Coating applicator shall be certified by the coating manufacturer as an approved applicator. Coating applicator's personnel shall be trained in the coating material being applied by the coating manufacturer. Shop equipment shall be certified by the coating manufacturer to meet the requirements for material mixing, temperature control, application rate, and ratio control for multi-part coatings. Equipment not meeting the coating manufacturer's written requirements will be rejected for coating application until repairs or replacement of the equipment is made to the satisfaction of the coating manufacturer and ENGINEER.
- B. The coating manufacturer shall provide a qualified technical representative, employed by the coating manufacturer, at the shop applied coating facility for 1 day, minimum, at the start of coating application. During this visit, the manufacturer's representative shall conduct inspections as required to ensure that coating application is in conformance with their recommended methods and conditions.
- C. Additional visits by the manufacturer's representative shall be made at sufficient intervals during surface preparation and coating application as may be required for product application quality assurance, and to determine compliance with manufacturer's instructions, and as may be necessary to resolve problems attributable to, or associated with, manufacturer's products furnished for this Project.
- D. Field Coating of Pipe Joint Applicator's Certification or Experience: Exterior field coating of pipe joint applicators shall be certified and trained by the heat shrink sleeve coating manufacturer or steel pipe manufacturer.
- E. Provide the ENGINEER a minimum of 7 days advance notice of the start of any shop coating work and a minimum of 3 days advance notice for field work.
- F. Inspection Devices: Furnish inspection devices that are calibrated and in good working condition for the detection of holidays and measurement of coating film thickness.
- G. Inspection: At a minimum, tests shall include holiday detection, adhesion testing, and coating film thickness. Perform adhesion testing on each pipe coated during

the first full day of coating application and as requested by the ENGINEER if surface preparation or coating application is suspect.

- H. Perform complete holiday detection of field coatings and repair defects.
- I. Immediately before the coated pipe is lowered into the trench, provide a visual and field electrical holiday inspection of the pipe coating as specified in Paragraph 3.9.
- J. Provide a log of visual and electric holiday inspections.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Handle pipe in accordance with AWWA C222 and in such a manner as to protect the pipe and coating from damage.
- B. Do not install coated pipe until the coating has developed full adhesion and cure.
- C. Take precaution during coating application, storage, loading, transportation, unloading, laying and installation to protect and prevent damage to pipe and coating. Lift pipe in accordance with AWWA C604 and pipe manufacturer's instructions in a manner that will not damage the coating. Metal chains, cable, tongs, forklifts or other equipment likely to damage the coating will not be permitted. Dragging or skidding of pipe on grade or in the trench will not be permitted.
- D. Provide transportation vehicles with padded bolsters between each layer of pipe and heavy padding under load ties. Bolsters shall be curved to fit the outside of the pipe and 12 inches wide, minimum. Heavily pad pipe contact locations with carpet during shipment to the Project Site and from the storage yard to the point of installation.
- E. Do not store pipe on rocks, gravel, or other hard materials that might damage the coating. Provide padded 12-inch wide skids and chucks, sand bags, select loamy or sand berms, or suspended from cutback ends, where possible, to minimize coating damage. Do not lay pipe on asphalt without suitable padding at contact points.
- F. Inspect pipe at the Project Site for damage. Repair damage to the pipe or coating as directed if, in the opinion of the ENGINEER, a satisfactory repair can be made; otherwise, replace the damaged section at the sole expense to the CONTRACTOR.
- G. No metal tools or heavy objects shall be permitted to come into contact unnecessarily with the finished coating. Workmen shall not be permitted to walk on the coating except when absolutely necessary and approved by the ENGINEER. When permitted, use shoes with rubber or composition soles and heels or other suitable footwear that will not damage coating.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Store, handle, and apply coatings per the manufacturer's written directions. Clean and coat exterior pipe surfaces in accordance with referenced AWWA Standards, written directions of the coating manufacturer, and these Specifications, whichever is more stringent. Prepare other surfaces to be coated as required for steel pipe, as applicable.
- B. Provide polyurethane coating from a single manufacturer. Substitutions will not be permitted.

2.2 EXTERIOR SHOP-APPLIED COATINGS

- A. Plural Component Polyurethane:
 - 1. Apply plural component polyurethane coating system (referred to hereafter as polyurethane system) in accordance with AWWA C222, except as modified herein.
 - 2. Coating: Self-priming, plural component, 100 percent solids, polyurethane, suitable for burial or immersion, and the product of one of the following approved manufacturers:
 - a. Futura Coatings (Protec II), Hazelwood, Missouri.
 - b. Carboline Company, St. Louis, Missouri
 - c. No substitutions.
- B. Coating Thickness:
 - 1. Exterior Surface:
 - a. Minimum 30 mil DFT, or
 - b. Minimum 60 mil DFT for 100-feet each side where pipeline crosses cathodically-protected facilities. The limits of thicker coating are indicated in the Drawings.
 - 2. The polyurethane system may be applied to any maximum dry film thickness as recommended by the manufacturer. When applied at the maximum dry film thickness, the coating system shall pass all performance requirements as specified in AWWA C222.4.2.
 - 3. The dry film thickness of the coating shall be measured in accordance with SSPC-PA 2. The averages listed in SSPC-PA 2 shall be deleted and no single gauge reading shall be less than the specified minimum thickness.

2.3 FIELD EXTERIOR JOINT COATING

- A. Field coat pipe joints with heat-shrink sleeves after pipe assembly in accordance with AWWA C216. Heat Shrinkable Sleeves:
 - 1. Filler Tape: Extruded butyl rubber compound compatible with heat shrink sleeve. Polyken 939 or approved equivalent.
 - 2. Heat Shrink Sleeve: Covalence WPCT or Canusa Aqua-Shield. No substitutions accepted.
 - a. Minimum Total Thickness: 90 mils.

2.4 FIELD REPAIR OF COATINGS

- A. General:
 - 1. Field coating shall be compatible with the shop-applied coating system or shall be provided by the same manufacturer.
 - 2. Apply coating to field joints using only personnel trained by the field coating manufacturer or steel pipe manufacturer.
- B. Polyurethane Coating:
 - 1. Repair polyurethane coating system in accordance with the coating manufacturer's recommended procedures.
 - 2. Coating material for repairs greater than 6 inches diameter shall be the same as the existing coating, or for repairs less than 6 inches diameter, repair coating as recommended by the polyurethane coating manufacturer, subject to ENGINEER approval. Repair coating shall have adhesion and performance characteristics equal to the existing coating.

2.5 FIELD COATING OF ACCESS MANWAYS, COUPLINGS, AND FLANGES

- A. Field coat access manways and couplings with wax tape in accordance with AWWA C217. Apply manufacturer's filler to eliminate voids and provide smooth surfaces for tape.
- B. Field coat flanges and blind flanges in accordance with Section 09 90 04, Painting, System No. 1, or wax tape in accordance with AWWA C217. Apply manufacturer's filler to eliminate voids and provide smooth surface for tape.

PART 3 - EXECUTION

3.1 GENERAL

- A. Inspect and provide substrate surfaces prepared in accordance with these Specifications and the printed directions and recommendations of coating manufacturer whose product is to be applied.

3.2 ENVIRONMENTAL CONTROLS

- A. General:
 - 1. Provide heating, cooling, or dehumidification equipment as required to meet the surface preparation and coating application environmental requirements as specified and recommended by the coating manufacturer.
 - 2. Products shall comply with federal, state, and local requirements limiting the emission of volatile organic compounds and worker exposure.
 - 3. Comply with applicable federal, state, and local, air pollution and environmental control regulations for surface preparation, blast cleaning, disposition of spent aggregate and debris, and coating application.
 - 4. Do not perform abrasive blast cleaning whenever the relative humidity exceeds 85 percent or whenever surface temperature is less than 5 degrees F above the dew point of the ambient air.
 - 5. Do not apply coatings when:
 - a. Surface and ambient temperatures exceeds the maximum or minimum temperatures recommended by the paint manufacturer or these Specifications,
 - b. In dust or smoke-laden atmosphere, blowing dust or debris, damp or humid weather, or under conditions that could cause icing on the metal surface.
 - 6. Where weather conditions or Project requirements dictate, provide and operate heaters and/or dehumidification equipment to allow pipe surfaces be abrasive blasted and coated as specified and in accordance with the manufacturer's coating application recommendations.
- B. Temperature Control:
 - 1. When temperatures are above or below the coating manufacturer's recommended application temperatures, provide temperature controls to permit Work to proceed within the temperature limitations of the Project.
 - 2. Heat with indirect fired heaters that do not increase humidity levels within the Work area. Size heaters for the area to be heated.
 - 3. Provide tenting, baffles, or bulkheads as required to zone and control the heating or cooling effectiveness.

3.3 SHOP-APPLIED COATING SYSTEM

A. General:

1. Strict conformance to the requirements of the manufacturer's coating application manual will be required. Deviation from the requirements of the manual will be grounds for the ENGINEER to reject the applied coating. Remove rejected coating to bare metal and reapply using proper application methods in accordance with the quality assurance manual and the requirements of these Specifications.
2. Coating applied under improper environmental conditions will be rejected and removed to bare metal and reapplied under proper environmental conditions.
3. Pipes and other items that exceed the allowable quantity of coating defects, regardless of size or cause, shall be rejected and the coating removed to bare metal and recoated.

B. Surface Preparation:

1. Remove visible oil, grease, dirt, and contamination in accordance with SSPC-SP1, solvent cleaning.
2. Remove surface imperfections such as metal slivers, burrs, weld splatter, gouges, or delaminations in the metal by filing or grinding prior to abrasive surface preparation.
3. In cold weather or when moisture collects on the pipe and the temperature of the pipe is less than 45 degrees F, preheat pipe to a temperature above 50 degrees F and 5 degrees F above dew point.
4. Clean pipe by abrasive blasting with a mixture of steel grit and shot to produce the surface preparation cleanliness as specified. Clean recycled abrasive of debris and spent abrasive.
5. Protect prepared pipe from humidity, moisture, and rain. Keep pipe clean, dry, and free of flash rust. Remove flash rust, imperfections, or contamination on cleaned pipe surface by reblasting prior to primer application.
6. Complete priming and coating of pipe the same day as surface preparation.
7. Surface Preparation: SSPC-SP10, Near White Metal blast, 3.0 mil profile, minimum, or as required by the manufacturer, whichever is greater.

C. Polyurethane Coating Application:

1. Maintain pipe temperature between 75 and 100 degrees F and 5 degrees F above dew point during coating application. Perform coating application in an environmentally controlled area that meets or exceeds the written environmental application requirements of the coating manufacturer.
2. Thickness: Additional thickness may be required to pass the holiday and coating defects limitations as specified in this section.
3. Test coating adhesion and holiday testing as specified in this section.
4. Complete coating repairs as specified in this section.

D. Holdbacks and Cutbacks:

1. 6 inches, minimum.
2. Make coating cutbacks or holdbacks straight and cut through the full thickness of the coating. Complete cutbacks in a manner that permits field coating of joints in accordance with the manufacturer's recommendations

and as specified herein.

3.4 FIELD COATING OF PIPE JOINTS - EXTERIOR

- A. Coat exterior pipe joints with heat-shrinkable sleeves in accordance with AWWA C216 and as specified herein. Apply heat shrinkable sleeves to field joints using personnel trained by the heat shrink manufacturer or steel pipe manufacturer.
 - 1. Prepare pipe surface as follows:
 - a. Adhere to OSHA and EPA regulations and coating manufacturer's recommendations for surface preparation and coating application.
 - b. Power tool clean in accordance with SSPC-SP3 for shop blasted surfaces that have been coated with storage primer.
 - c. Hand tool clean areas to be coated in accordance with SSPC-SP2 that cannot be cleaned with power tool cleaning.
 - d. Solvent clean surfaces to be coated in accordance with SSPC-SP1.
 - e. Remove burrs, sharp edges, and weld spatter prior to abrasive blasting.
 - 2. Apply filler tape at lap joints, step downs, and other discontinuities. Lap joints containing 1:1 sloped fillet welds do not require filler tape.
 - 3. Fit coating material to area as recommended by manufacturer based on type and recovery of material.
 - 4. Shrink the coating material to tightly conform to pipe joint and overlap shop coating using manufacturer's recommended heat sources and methods.
- B. Completely remove and replace finish coatings having wrinkles, gaps, holes, or burns until acceptable coverage is achieved.
- C. Coating application is prohibited when there is water or slurry in bell holes.
- D. Holiday Testing:
 - 1. Clean and dry the pipe surface when tested.
 - 2. To avoid damage to the coating, the electrode should always be kept in motion while test voltage is being applied. Always keep the electrode in firm contact with the coated surface. Move the electrode in an even manner over the surface at an approximate rate of 0.5 to 1 foot of travel per second. Do not exceed 1 foot of travel per second as the maximum rate of speed during holiday testing.
 - 3. Mark location of detected holidays for repair. Retest after repair.

3.5 FIELD REPAIR OF COATING

- A. General:
 - 1. Repair areas where holidays are detected or coating is visually damaged, such as blisters, tears, rips, bubbles, wrinkles, cuts, or other defects. Repair areas where no holidays are detected, but are visually damaged.
 - 2. Clean area to be repaired for a minimum distance of 6 inches in all directions from the damaged area by solvent wiping.
- B. Polyurethane Coating Repairs:
 - 1. Complete shop and field coating repairs in accordance with the manufacturer's written instructions and these Specifications, whichever is more stringent.

2. Unless otherwise accepted by ENGINEER, do not provide coating repairs on any joint of pipe greater than an average of 2 per 100 square feet of surface area per joint of pipe or an individual defect greater than 6 inches in diameter. Holidays within a 4 inch radius of a holiday shall be counted as a single holiday.
3. Unless otherwise accepted by ENGINEER, blast pipes exceeding the maximum number or size of coating defects to bare metal and recoat.
4. Unless otherwise accepted by ENGINEER, pipe arriving in the field with defects or repairs exceeding the maximum number or size of coating defects will be returned to the shop for recoating at no additional cost to UTILITIES.
5. Repair surface defects, that do not expose the metal substrate by power tool sanding with coarse sandpaper to roughen the coating surface and feathering the edges of the defect for a minimum of 3 inches around the defect. Apply a single coat of the specified patch coating material to a properly prepared surface at the specified coating thickness.
6. Prepare deep defects, defined as defects which penetrate to the metal substrate or expose the metal substrate to the metal substrate by power tool sanding to expose the metal and feather the coating edges a minimum of 6 inches. Reblast the metal surface and surrounding coating to equal cleanliness and profile as the original surface preparation. Roughen existing coating to the equivalent of coarse sandpaper by abrasive blasting. Apply one coat of the specified coating material over the repaired surface at the specified thickness.

3.6 WAX TAPE COATING INSTALLATION

- A. Coat bolts and nuts of all buried or exposed flanges, blind flanges, couplings, dismantling joints, etc. with three-part, cold-applied wax tape coating system consisting of primer, wax tape, and tape outerwrap.
- B. Wax Tape Application
 1. Ensure surfaces are free from loose rust, scale, paint, dirt, and other foreign matter in accordance with SSPC-SP2.
 2. Apply primer by hand or brush to surfaces to be coated. Work primer into crevices, around studs and nuts, and completely cover exposed metal surfaces.
 3. Extend primer a minimum of 3-inches onto adjacent surfaces of the pipe.
 4. Apply wax tape immediately after primer application.
 - a. Cut short lengths of tape and place around each bolt head and nut.
 - b. Work tape into crevices around studs and nuts.
 - c. Cover entire primed area with wax tape using minimum overlap of 55% of tape width.
 - d. Work tape into crevices and contours of irregular shaped surfaces and smooth out to obtain continuous protective layer with no voids or spaces under tape.
 5. Apply tape outerwrap to wax tape installation. Extend plastic wrap a minimum of 3-inches beyond wax tape using a minimum overlap of 55% of plastic material width to apply two layers of overwrap.

3.7 SHOP QUALITY CONTROL

- A. General:
 1. UTILITIES' representative may conduct additional quality assurance

inspection and testing for final acceptance of the pipeline coatings. Coating repairs for quality assurance testing shall be repaired by the applicator as specified herein.

2. UTILITIES' may conduct additional quality assurance inspection and testing for final acceptance of the pipeline coatings prior to shipment from the fabrication shop. Contractor shall notify ENGINEER AND UTILITIES' two weeks prior to shipment to schedule shop inspection and testing of the pipeline coatings.

B. Adhesion Testing:

1. General
 - a. In addition to the testing protocol required in AWWA C222, provide a minimum of four adhesion tests on four separate pipe joints for every production day.
 - b. Repair coating damage from adhesion testing.
 - c. Perform adhesion tests not less than 24 hours after coating application.
 - d. Pipe joints will be randomly selected for adhesion testing. If any one of the pipe joints tested fails the adhesion test, two additional tests shall be performed on that pipe joint. If any one of the additional tests fails, that pipe joint shall be rejected. An additional two pipe joints from that day's production shall be tested for every rejected pipe joint.
2. Polyurethane Adhesion Testing:
 - a. Polyurethane coatings shall have an adhesion to steel of 1,500 pounds per square inch, minimum.
 - b. Test polyurethane coating adhesion to steel substrates using pneumatic pull off equipment, such as HATE equipment or equal, in accordance with ASTM D4541 and AWWA C222, except as modified in this section.
 - c. Glue dollies for adhesion testing to the coating surface and allow to cure for a minimum of 12 hours. Score coating around the dolly prior to conducting the adhesion test. Dollies shall be concave or convex to fit the pipe surface on any pipe less than 30 inches in diameter.
 - d. Failure shall be by adhesive failure only. Adhesive failure is defined as separation of the coating from the steel substrate on over 20 percent of the bonded surface. Glue failures in excess of the minimum required tensile adhesion are acceptable as meeting the specified adhesion requirements.
 - e. Randomly select repair patches on the polyurethane coating for adhesion testing in a manner as described herein and at the discretion of the person conducting the adhesion tests. Inter-coat adhesion of repairs shall be not less than 50 percent of the specified polyurethane coating adhesion requirements to steel.
3. Holiday Testing:
 - a. Polyurethane Coatings:
 - 1) Conduct holiday tests on the completed coating after a minimum of 1-hour cure using a high voltage spark test in accordance with NACE Standard SP-0188 and these Specifications.
 - 2) Perform holiday testing at a voltage of 100 volts per mil of the average coating thickness.
 - 3) Use the average dry film thickness testing results to determine the coating thickness used for holiday testing.
4. Dry Film Thickness Testing: Test coatings for dry film thickness in accordance with SSPC PA-2 using a properly calibrated magnetic pull off or eddy current equipment.

3.8 FIELD QUALITY CONTROL

- A. Provide a visual and field electrical holiday inspection of the pipe coating immediately before the coated pipe is lowered into the trench.
- B. Electrical Coating Inspection:
 - 1. Electrically test field applied coatings and pipe coating repairs with a portable high-voltage holiday detector. Test areas as directed by the ENGINEER and/or UTILITIES. Provide equipment and conduct testing in accordance with NACE Standard SP-0188 and the coating manufacturer's written directions for type and thickness of coating being tested. Furnish one portable high-voltage detector for each pipe laying crew.
 - 2. Set electrical holiday test equipment at voltage as recommended by coating manufacturer. Set the minimum test voltage for a particular coating type and thickness to be within 20 percent of the voltage as determined by the following formula:

$$\text{Testing Voltage} = 1250\sqrt{T}$$

Where T = Average coating thickness in mils (0.001 inch)

- 3. Provide the type of detector with the minimum and maximum voltage setting, inspection speed, and holiday detector electrode type (wire brush or electrically conductive silicone or coil spring) as recommended by the coating manufacturer for the coating type and thickness being tested. Maintain the holiday test equipment in good working condition per detector manufacturer's recommendations.
- 4. Adjust the holiday detector during testing to the correct voltage setting and operate in accordance with holiday detector manufacturer recommendations. Recheck voltage setting at start of each day and a minimum of two times during the day and when requested by ENGINEER.
- 5. Provide the holiday detector with an audible signal when electrical contact is made between the pipeline and the electrode at holidays (defects) in the coating. Provide a good ground and a low electrical resistance between the holiday detector and the pipeline. Make only direct connections to uncoated areas or to the pipe ends at the pipe joint cut back areas.
- 6. Clean and dry the pipe surface when testing. To avoid damage to the coating, the electrode always be kept in motion while test voltage is being applied. Always keep the electrode in firm contact with the coated surface. Move the electrode in an even manner over the surface at an approximate rate of 0.5 to 1 foot of travel per second. Do not exceed 1 foot of travel per second as the maximum rate of speed during holiday testing.
- 7. Mark location of detected holidays for repair. Retest after repair.

SECTION 26 42 13
PASSIVE CATHODIC PROTECTION FOR UNDERGROUND AND SUBMERGED PIPING

The Colorado Springs Utilities Water Line Extension and Service Standards are hereby revised as follows:

Add the following:

SECTION 26 42 13
PASSIVE CATHODIC PROTECTION FOR UNDERGROUND AND SUBMERGED PIPING

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section specifies sacrificial anode cathodic protection system for steel pipelines.

1.2 REFERENCES

- A. American Society of Testing and Materials (ASTM):
1. ASTM B843 Magnesium Alloy Anodes for Cathodic Protection
 2. ASTM G97 Laboratory Evaluation of Magnesium Sacrificial Anode Test Specimens for Underground Applications
- B. National Association of Corrosion Engineers (NACE):
1. NACE SP0169 Control of External Corrosion on Underground or Submerged Metallic Piping Systems
- C. American Society for Quality (ASQ):
1. ANSI/ASQ Z1.4 Sampling Procedures and Tables for Inspection by Attributes

1.3 QUALITY ASSURANCE

- A. CONTRACTOR Cathodic Protection Personnel
1. Provide personnel trained and experienced in the installation of cathodic protection equipment, such as cadwelding, exothermic weld coatings, anodes, insulating flange kits, test stations, and joint bonding.
- B. CONTRACTOR Cathodic Protection Technician
1. Provide a NACE certified Cathodic Protection Technician to perform periodic quality control inspection and testing during and after construction. At a minimum, perform inspection at start of cathodic protection installations, monthly during the course of the work, and after completion of installation for all cathodic protection equipment.
 2. CONTRACTOR's NACE certified Cathodic Protection Technician shall prepare the operation and maintenance manual.

C. UTILITIES' Cathodic Protection Technician

1. UTILITIES will provide their own independent NACE Cathodic Protection Technician to periodically inspect and test the Work.
2. UTILITIES' NACE Cathodic Protection Technician will test selected components of each system installed to confirm the accuracy of the CONTRACTOR's testing, prior to acceptance.
3. Coordinate the Work to allow UTILITIES' NACE Cathodic Protection Technician to perform inspection and testing.

D. UTILITIES may reject the entire lot of anodes if a representative sample does not meet the Acceptable Quality level 2.5, per ANSI/ASQ Z1.4 for a Single Sample Plan using Normal Inspections and the General Inspection Level II.

1.4 SUBMITTALS

A. Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures.

1. Test Station Boxes and Posts, Terminal Boards, and Shunts.
2. Exothermic Weld Caps, Primer, and Mastic Coating
3. Conductors, Test Station Wires, and Joint Bond Wires
4. Wire Splice Kits
5. Wire Terminal Connectors
6. Exothermic Weld Equipment and Materials
7. Wire and Cable Marker Tags
8. Insulating Flange Kits
9. Insulating Mechanical Couplings
10. Joint Continuity Test Procedure
11. Cathodic protection technician qualifications
12. Cathodic protection installers manufacturer certifications
13. Manufacturers certificate of chemical analysis for each shipment of magnesium anodes
14. Testing procedures
15. Magnesium anodes

B. Perform and submit test report and operations and maintenance manual of the cathodic protection system after completion of installation.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect anodes from moisture. Mark anode bags with designated anode weight in pounds. Pack and ship anodes on shrink-wrapped wooden pallets.

PART 2 - PRODUCTS

2.1 GENERAL

A. Unless otherwise specified, furnish materials and equipment of domestic (USA) manufacture and of the best quality used for the purpose in commercial practice. Conform to the respective specifications and other requirements specified herein.

2.2 ANODES

A. High potential magnesium anodes in compliance with Code of Federal Regulations Title 49, U.S. Department of Transportation, Part 192.

B. Manufactured and tested in conformance with ASTM B843 and ASTM G97.

1. Anodes shall conform to the following composition by weight in compliance with ASTM B843

Magnesium Alloy:

Aluminum	0.01% maximum
Manganese	0.50% minimum to 1.30% maximum
Zinc	0.004% maximum

Impurities:

Silicon	0.05% maximum
Copper	0.02% maximum
Nickel	0.001% maximum
Iron	0.03% maximum total
Other	0.30% maximum each
Magnesium	Balance

2. Size: As specified in the Drawings, bare weight.
3. Shipped and stored in waterproof bags. Securely tied to prevent shifting of the anode and backfill material within the package.
4. Packaged in closely woven, permeable, cloth bag with at least 1-inch of well-compacted backfill mixture consisting of 75% gypsum, 20% bentonite, and 5% sodium sulfate. Backfill particle size of 15% maximum retention by weight on a 20-mesh screen and 75% maximum retention by weight on a 100-mesh screen. Bag end to be securely tied to prevent shifting of the anode and backfill material within the package.
5. The core will be of a size and shape that will ensure an adequate electrical and physical bond to the anode. Position core in the center of the anode and along the entire length of the longitudinal axis.
6. Anode lead wires: #12 AWG insulated THWM or THHN copper, minimum 20 feet in length. The lead wires shall be connected to the galvanized steel core of the anode by silver soldering and this connection shall be sealed with a waterproof epoxy or electrical potting compound. Anode lead wires should be of sufficient length to reach test stations with splicing.
7. Manufacturer: Farwest UltraMag High Potential Magnesium Anodes, or approved equivalent.

2.3 WIRE CONDUCTORS

- A. Test Station Wire: #8 AWG single conductor, stranded copper, with Type RHW-2/RHH-2/USE-2 insulation for connections to steel pipelines and steel casing pipe. Wire color coding as shown on the Drawings.
- B. Joint Bond Wires: #2 AWG single conductor, stranded copper, with Type HMWPE insulation.
- C. Joint Bond Wires for Mechanical Coupling Follower Rings: #8 AWG single conductor, stranded copper, with Type HMWPE insulation.

2.4 WIRE SPLICE CONNECTIONS

- A. Mechanical connector or crimpit type connector and soldered then sealed with an epoxy type material. Approved manufacturers: Royston MINI SPLICE- RIGHT with Burndy KS-90 split bolt or approved equivalent. Splices of buried test station or

anode wires are not acceptable without approval by the UTILITIES and ENGINEER. Above grade splices are acceptable and shall be completed as shown on the Drawings.

2.5 WIRE CONNECTIONS

A. EXOTHERMIC WELDS

1. Exothermic type weld materials including the proper size, type of weld cartridges, and welder molds suitable for use on steel pipe. Approved manufacturers: Erico Products Inc. CADWELD, Burndy THERMOWELD, or approved equivalent.
2. Crimp copper sleeves specifically designed for the purpose on bare wire ends of stranded cables prior to exothermic welding to improve mechanical strength and thermal capacity.

B. PIN BRAZING

1. Electrical cable connections to the buried piping shall be made by pin brazing. Pin brazing equipment and materials including the proper size and type of brazing pins and ferrules for use on steel pipe shall be by BAC Corrosion Control or approved equivalent.

2.6 PIPELINE AND WIRE CONNECTION COATING

- A. Prefabricated weld cap assembly composed of a plastic dome prefilled with a corrosion resistant mastic, a layer of elastomeric adhesive attached to the plastic dome, and a layer of tapecoat gray protective adhesive with integrated primer. Approved manufacturers: Tapecoat/Royston Handy Cap IP or approved equivalent.

2.7 TEST STATIONS

A. Test stations in paved areas:

1. Flush-to-ground test station type, manufactured by: CP Test Services NM-7 or approved equivalent. Lid inscribed with the words "CP TEST". A pipeline marker or bollard with UTILITIES designation, and UTILITIES phone number shall offset the test station location at the nearest protected location (i.e. behind curb, at fence, etc.).
2. Terminal board: manufactured from a minimum 3/16" thick plastic or glass reinforced laminate with minimum dimensions of approximately 3 inches by 4 inches to terminate the test station wires.
3. Terminal board hardware: Nickel-plated brass consisting of a minimum of five 1/4 inch studs with double nuts, flat washers, and lock washers.
4. Shunts: 0.01 OHM, manufactured by Holloway or approved equivalent.

B. Test stations in unimproved areas:

1. Post mount test station consisting of an enclosure and terminal board with studs and galvanized rigid conduit.
2. Manufacturer: Maloney Technical Products, Model V3 Phantom Splice/Test Station. Manufactured with a blue cap and two terminals, white support post, total 66-inches in length. Graphic on cap to be printed with white letters with same graphics in material specification 346-100-031. Equipped with manufacturer-furnished 0.01 OHM shunts. No substitutions accepted.

2.8 INSULATING FLANGE KITS

- A. Dielectric flange kit materials consisting of full faced gaskets, bolt sleeves, non-metallic washers, and steel backing washers.
- B. Gaskets:
 - 1. For pipe less than 24-inches in diameter: Type "E" (full face) phenolic with a Buna-N o-ring type sealing element as manufactured by Pipeline Seal and Insulator or approved equivalent.
 - 2. For pipe 24-inches in diameter and larger: Type "E" (full flat face) phenolic as manufactured by Pipeline Seal and Insulator or approved equivalent.
- C. Insulating bolt sleeves: Single one-piece sleeve and washer type made of Minlon or acetal resin plastic, fitting within the bolt facing of the flange, and allowing the standard size bolt or stud for the flange to be inserted. If the flange bolt diameter is larger than 1.5 inches, a two-piece sleeve and washer set consisting of a mylar bolt sleeve and phenolic washer is acceptable.
- D. Steel backing washers: 1/8" thick, cadmium plated, hot rolled steel and fitting within the bolt facing on the flange.

2.9 INSULATING MECHANICAL COUPLINGS

- A. Approved manufacturers: Dresser "Style 39", Rockwell "416", Romac "IC501", Baker "Series 216" without pipe stop, or approved equivalent.

2.10 WIRE MARKER TAGS AND PENS

- A. Marker Tags: Manufactured of permanent weather resistant and UV light resistant nylon. Attached to a plastic non-releasing holding device and cable fastening tail. Marker tag writing surface: 0.75" long x 1.0" wide. Approved manufacturer: Panduit Corporation Part No. PLF1MA or approved equivalent.
- B. Marker Pens: Fine point waterproof ink nylon marker pen designed specifically for this purpose. Approved manufactures: 3M ScotchCode SMP marking pen, Panduit PFX-0 marking pen, or approved equivalent.

2.11 MARKER TAPE

- A. Marker tape for buried cables shall consist of 3-inch wide, 4-mil thick, non-adhesive polyethylene that is impervious to alkalies, acids, and other soil components.
- B. Marker tape shall be yellow in color with black lettering.
- C. Marker tape shall be imprinted with the following repeated message:
"CAUTION: CATHODIC PROTECTION CABLE BURIED BELOW."

2.12 PERMANENT REFERENCE ELECTRODES WITH COUPONS

- A. Copper sulfate permanent reference electrodes shall be designed for buried service in native soil.
- B. Reference electrodes shall be warranted for a minimum 20 year service life.

- C. The surface sensing area of the reference electrode shall be a minimum of 20 square inches.
- D. The coupon must replicate the characteristics of the pipe material to be installed and shall provide 2 wires to be terminated inside the test station.
- E. Reference electrodes and coupons shall be supplied with #14 or #16 AWG type RHW-2 cable or similar rated for direct burial, wet conditions. Lead wires shall be a minimum of 50 feet in length or sized to match application with no belowgrade splicing required.
- F. Reference electrodes shall be Corrosion Service Model CPMP-2-50 or approved equivalent and be installed per the manufacturers specifications.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install the cathodic protection system in compliance with NACE SP0169.

3.2 WORKMANSHIP

- A. Install materials and equipment in accordance with the manufacturer instructions.

3.3 SACRIFICIAL ANODE INSTALLATION

- A. Store and install anodes in accordance with manufacturer's instructions. While in storage, maintain anodes manufacturer-approved waterproofing protection. Do not use damaged anodes or damaged anode wires. Replace damaged materials with new unused materials. Remove anode waterproofing protection before installing the anode.
- B. Install anodes at the locations indicated on the Drawings. Anode locations or spacing may be adjusted slightly to clear other buried or topographical obstructions with prior approval of the UTILITIES and ENGINEER.
- C. Install anodes completely dry. Lower anodes into the excavated holes using rope sling or by grasping the cloth gather. Do not use the anode lead wires to lower the anodes. Backfill the anode with fine native excavated soil (do not use imported sand or other select backfill) in six inch layers. Hand-tamp each layer around the anode. Take care to not strike the anode or lead wire with the tamper. After the anode has been backfilled approximately halfway, add a minimum of ten gallons of fresh water and allow to soak into and around the anode. After the anode and surrounding soil have absorbed the water, continue backfilling and tamping with native soil to six inches above the anode. Add another minimum of five gallons fresh water and allow to soak into the soil. After the water has soaked in, complete backfilling and soil compaction to the top of the hole.

3.4 TEST STATION INSTALLATION

- A. Install test stations directly over the pipe in unimproved areas. Install test stations behind curb in paved areas. Place test station boxes on flat blocking to minimize settlement.
- B. Extend test station wiring 2 feet above the top of the test station box or line post. A

minimum of 18 inches of each wire routed to the test stations should be coil and placed within the test station body.

- C. Wire terminations for conductor sizes of #8 AWG and larger shall be made with single hole terminal lugs of corrosion resistant bronze, copper, or nickel plated brass similar to Blackburn Type L (socket), Square D Company Type LU, Burndy SCRULUG Type KPA or other approved equal. Wire connections to the test station terminal boards for conductor sizes of #14 through #10 AWG shall be terminated with a properly sized uninsulated support ring tongue compression connector similar to Panduit P10-14R-L or Burndy Hylug Type YAV Box Ring Tongue connectors, or other approved equivalent. Additionally, all wires shall be soldered to the ring tongue connectors.
- D. Temporarily store and protect shunts until final connections. Do not connect wires to the test station terminal board. Shunt installation and terminal board connections will be performed during final testing and commissioning of the cathodic protection system. Final connections shall be made by UTILITIES.
- E. Permanently identify each wire using nylon marker tags and plastic cable ties as shown on the Drawings. Using marker pen, complete marker tag identification using block type lettering with the letter size to be a minimum of 1/8" high.
- F. Specify test station number, pipe diameter, pipe material. Test Station numbering is shown on the Drawings.

3.5 WIRE CONNECTIONS TO BURIED PIPING

- A. Connect anode wire, test station wire, and joint bond wire by exothermic welding or pin brazing. Whenever possible, make connections at joint coating holdback areas. Clean an area approximately 2-inches by 2-inches in size on the pipe surface with a grinder or metal file to a bright shiny condition. Complete each connection using the appropriate weld charge, welder, brazing pin, and ferrule as per the manufacturer's recommendations. Install a properly sized copper wire sleeve around the bare wire end of test station and joint bond wires of #8 AWG or smaller prior to welding to improve weld strength and thermal capacity. Completed welds shall be capable of withstanding moderate hammer blows.
- B. For steel pipe: After the weld and surrounding metal surface has cooled, clean, prime, and cover as shown on the Drawings.
- C. For ductile iron pipe: After the weld and surrounding metal surface has cooled, clean the metal surface and cover as shown on the Drawings.

3.6 WIRE SPLICE CONNECTIONS

- A. Complete above grade splice connections of anode or test station wires with a splice connection kit. Below grade splice connections are not allowed unless approved by UTILITIES and ENGINEER.
- B. Complete installation of the splice connection kit per the manufacturer's instructions and solder the wires to the split bolt or crimp connector after tightening.

3.7 ELECTRICAL ISOLATION

- A. Accomplish electrical isolation using insulating flange kits or insulating mechanical couplings where shown on the Drawings. In the event an insulating coupling is restrained using harness rods, insulate each rod using a properly sized one-piece insulating sleeve and washer with steel backing washer.
- B. Order insulating flange kits according to pipe size and pressure rating of the flange and install per the manufacturer's instructions. Exercise care so as not to damage the insulating bolt sleeves.
- C. Clean all insulating components of dirt, grease, oil, and other foreign materials immediately prior to assembly. Properly align bolt holes in mating flanges at the time bolts and insulating sleeves are inserted to prevent damage to the insulation. Inspect each insulating washer for cracks or other damage after flanged bolts have been tightened. Replace damaged washers.
- D. Test isolation of installed insulating materials prior to backfilling and again after backfill as required.
- E. If the pipe is steel, coat and wrap bare or non-coated pipe exposed during the excavation on the non-cathodically protected side of insulated flanges or insulated mechanical couplings.
- F. If the pipe is ductile iron, encase bare or non-coated pipe exposed during the excavation on the non-cathodically protected side of insulated flanges or insulated mechanical couplings with polyethylene wrap.

3.8 JOINT BONDING

- A. Bond non-welded pipe joint connections such as mechanical couplings, tees, elbows, and valves to ensure electrical continuity. Bond blow-off and hydrant piping.
- B. Test electrical continuity of installed joint bonding materials prior to backfilling and again after backfill as required.

3.9 TESTS AND INSPECTION

- A. Test Equipment: Before construction begins, obtain test equipment necessary for electrical continuity testing and the following equipment:
 - 1. Model 601, Above-Ground 702, Buried Insulation Checker, as manufactured by Gas Electronics Co., Seymour, MO.
 - 2. A Model 77 Series III, Digital Multimeter, with case and test leads, as manufactured by Fluke Corporation, Everett, WA.
 - 3. Two Model 6B copper-copper sulfate reference electrodes as manufactured by Tinker and Rasor, San Gabriel, CA.
 - 4. 1 quart of copper sulfate antifreeze solution.
 - 5. 1/2 pound of copper sulfate crystals.
- B. Store test equipment at Site and maintain in accurately calibrated working condition. Make test equipment available to UTILITIES and ENGINEER for testing purposes. Upon completion of Project, turn over test equipment listed above to UTILITIES in clean, accurate, and fully functional condition, along with operating manuals, test wires, and cases supplied with equipment.
- C. Electrical Continuity Testing:

1. Check and test completed cathodic protection system to ensure proper installation. Conduct tests in the presence of UTILITIES and ENGINEER.
 2. Field test installed anode wires and test station wires to verify integrity and functionality.
 3. Test electrical isolation between carrier and casing pipe before and after installing annular space grout.
 4. Record results of electrical continuity testing prior to backfill and upon completion of backfill and include in final test report.
 5. Provide UTILITIES and ENGINEER with 3 days' advance notice before beginning tests.
- D. Insulated Joint Testing: Test each insulated joint after assembly with the insulator tester in accordance with the manufacturer's written instructions. Replace damaged or defective insulation parts.
1. Correct defects identified during testing.
 2. Record results of insulated joint testing prior to backfill and upon completion of backfill and include in final test report.
 3. Provide UTILITIES and ENGINEER with 3 days' advance notice before beginning tests.

3.10 FUNCTIONAL TESTING

- A. Measure structure-to-soil potential of pipeline at each test station using equipment specified herein. Make structure-to-soil potential measurements at surface with a portable copper-copper sulfate reference electrode 25 feet from any installed anodes or with the permanent reference electrode installed at each test station. As a minimum, potential measurements shall include 'native', polarized, AC, foreign line, anode current outputs, and stray current measurements.
- B. Tabulate structure-to-soil potential measurements, with the date and test location, and submit to UTILITIES and ENGINEER.

3.11 CATHODIC PROTECTION CRITERIA

- A. Cathodic protection level will be considered satisfactory when polarized pipe- to-soil potential measurements at all locations are -0.85 volts or more negative when referenced to a copper/copper sulfate electrode. IR drops in the soil will be compensated for in the measurements.

3.12 INADEQUATE PROTECTION

- A. Correct inadequate pipe joint continuity or cathodic protection levels due to defective or incorrect installation work at no additional cost to UTILITIES.

3.13 OPERATION AND MAINTENANCE MANUAL

- A. Prepare and furnish a written O&M Manual upon completion of the cathodic protection system testing.
- B. The O&M Manual shall be organized into the following sections to facilitate future review:
 1. Cathodic Protection System Description: A written description of the structures to be protected and their cathodic protection systems including details of the pipe sizes, pipe materials including locations of any change in pipe material,

and coating; type and location of anodes, test stations, and insulating fittings; and the number of separate CP areas (electrically isolated pipe sections). The extent of each CP area should be defined by the location of piping end points and/or insulating fittings and the number of anodes and test stations installed in each CP area under this project should be indicated. In addition to the written description, a schematic of the CP system layout shall be completed showing the pipeline, valves, streets, fencelines, ditches and other topographic highlights, and all test stations.

2. Test Measurements and Field Data: A written report of the tests conducted at the completion the system installation under this project with the test data obtained listed in the previously specified tabular form. If necessary, include under separate tab any stray current interference testing, remediation, and actions.
3. Preventative Maintenance and Troubleshooting Procedures: Any manufacturer's equipment maintenance information as well as a written description of basic sacrificial anode cathodic protection system preventative maintenance and troubleshooting procedures including equipment necessary, the frequency and extent of pipe-to- soil surveys, interpretation of the pipe-to-soil potential data, proper documentation of survey data, how to locate defective insulating fittings, and what are underground "shorts" and how should they be located.

**SECTION 33 05 01.01
WELDED STEEL PIPE AND FITTINGS**

The Colorado Springs Utilities Water Line Extension and Service Standards are hereby revised as follows:

Add the following:

**SECTION 33 05 01.01
WELDED STEEL PIPE AND FITTINGS**

PART 1 GENERAL

1.01 THE REQUIREMENT

- A. Provide lined and coated welded steel pipe, specials, and fittings as specified herein, complete, in accordance with the Contract Documents.

2.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Society of Mechanical Engineers (ASME):
 - a. B16.47, Large Diameter Steel Flanges, NPS 26 Through NPS 60.
 - b. B16.5, Pipe Flanges and Flanged Fittings, NPS 1/2 Through NPS 24.
 - c. B16.9, Factory-Made Wrought Steel Buttwelding Fittings.
 - d. B36.10M, Welded and Seamless Wrought Steel Pipe.
 - e. BPVC SEC V, Nondestructive Examination.
 - f. BPVC SEC VIII, Div. 1, Rules for Construction of Pressure Vessels.
 - g. BPVC SEC IX, Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators.
 2. American Society for Nondestructive Testing Inc. (ASNT): SNT-TC-1A, Personnel Qualification and Certification in Non-Destructive Testing.
 3. American Water Works Association (AWWA):
 - a. C200, Steel Water Pipe – 6 inch (150 mm) and Larger.
 - b. C205, Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 in. (100 mm) and Larger - Shop Applied.
 - c. C206, Field Welding of Steel Water Pipe.
 - d. C207, Steel Pipe Flanges for Waterworks Service - Sizes 4 in. Through 144 in. (100 mm Through 3,600 mm).
 - e. C208, Dimensions for Fabricated Steel Water Pipe Fittings.
 - f. C209, Cold-Applied Tape Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.
 - g. C210, Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.
 - h. C213, Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
 - i. C214, Tape Coating Systems for the Exterior of Steel Water Pipelines.
 - j. C215, Extruded Polyolefin Coatings for the Exterior of Steel Water Pipelines.
 - k. C216, Heat-Shrinkable Cross-Linked Polyolefin Coatings for the Exterior of Special Sections, Connections, and Fittings for Steel Water Pipelines.
 - l. C218, Coating the Exterior of Aboveground Steel Water Pipelines and Fittings.
 - m. C219, Bolted, Sleeve-Type Couplings for Plain-End Pipe.
 - n. C221, Fabricated Steel Mechanical Slip-Type Expansion Joints.

- o. C222, Polyurethane Coatings for the Interior and Exterior of Steel Water Pipe and Fittings.
- p. C602, Cement-Mortar Lining of Water Pipelines in Place – 4 in. (100 mm) and Larger.
- q. M11 (Manual), Steel Water Pipe - A Guide for Design and Installation.
- 4. American Welding Society (AWS):
 - a. A2.4, Standard Symbols for Welding, Brazing, and Nondestructive Examination.
 - b. A3.0, Standard Welding Terms and Definitions.
 - c. D1.1, Structural Welding Code – Steel.
 - d. QC 1, Standard for AWS Certification of Welding Inspectors.
- 5. ASTM, International (ASTM):
 - a. A20, Standard Specification for General Requirements for Steel Plates for Pressure Vessels.
 - b. A36//A36M-08 Standard Specification for Carbon Structural Steel.
 - c. A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - d. A106, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service.
 - e. A234/A234M, Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
 - f. A283/A283M, Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.
 - g. A370, Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
 - h. A435/A435M, Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates.
 - i. A516/A516M, Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate- and Lower-Temperature Service.
 - j. A572/A572M, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
 - k. A770/A770M, Standard Specification for Through-Thickness Tension Testing of Steel Plates for Special Applications.
 - l. A1018/A1018M, Standard Specification for Steel, Sheet and Strip, Heavy Thickness Coils, Hot Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, and High-Strength Low-Alloy with Improved Formability.
 - m. D4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - n. E329, Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
 - o. E1255, Standard Practice for Radioscopy.
- 6. International Institute of Welding (IIW).
- 7. International Organization for Standardization (ISO).
- 8. NSF International (NSF):
 - a. 60, Drinking Water Treatment Chemicals - Health Effects.
 - b. 61, Drinking Water System Components - Health Effects.
- 9. Steel Pipe Fabricators Association (SFPA).

3.01 DEFINITIONS

- A. Fittings and Specials: Including, but not limited to fittings, closure pieces, bends, elbows, reducers, tees, wyes, bifurcations, crosses, outlets, manifolds, nozzles, wall sleeves, bulkheads, vent pipes, and other piping and appurtenances fabricated from steel plate, sheet, or coils as required to provide the Work, complete. Specials shall also include piping above ground or inside structures.

B. Acronyms:

1. CJP: Complete Joint Penetration.
2. CWI: Certified Welding Inspector.
3. LHA: Lining holdback area.
4. LT: Leak Testing.
5. MPS: Main pipe supplier.
6. MT: Magnetic Particle Testing.
7. NDE: Nondestructive Examination.
8. NDT: Nondestructive Testing.
9. PJP: Partial Joint Penetration.
10. PQR: Procedure Qualification Record.
11. PT: Liquid Penetrant Testing.
12. RT: Radiographic Testing.
13. UT: Ultrasonic Testing.
14. VT: Visual Testing.
15. WPQ: Welder/Welding Operator Performance Qualification.
16. WPS: Welding Procedure Specification.

C. Main Pipe Supplier: Manufacturer of the pipeline and as further defined in Paragraph 2.01.A.

4.01 DESIGN REQUIREMENTS

A. Fittings and Specials:

1. Design reinforcement, unless otherwise shown.
2. Design in accordance with AWWA Manual M11, AWWA C200, and AWWA C208.
3. Submit design calculations to the ENGINEER for review prior to manufacture of steel pipe fabricated specials. See Subparagraph 1.05.C.5.
4. For the purposes of design calculations, the following are defined:
 - a. Working Pressure (psi) = 300.
 - b. Test Pressure (psi) = 450.
5. Design elbows for working and test pressure using allowable stresses of $0.5F_y$ and $0.67F_y$, respectively.
6. Design outlet reinforcing for working pressure using an allowable stress of $0.5F_y$.
7. Design dished heads and test heads for test pressure in accordance with ASME Boiler and Pressure Vessel Code, Section VIII, Division 1.

B. Pipe Layout: Design complete pipeline layout, in accordance with AWWA Manual M11:

1. General:
 - a. Horizontal and Vertical Alignment: See Contract Drawings.
 - b. Base stationing and elevation convention as shown on Drawings.
 - c. Laying Lengths:
 - 1) Select lengths to accommodate installation operation.
2. Include, as Minimum:
 - a. Specific number, location, and direction of each pipe, joint, and fitting or special. Number each pipe in installation sequence.
 - b. Station and centerline elevation at changes in grade or horizontal alignment.
 - c. Station and centerline elevation to which bell end of each pipe will be laid.
 - d. Elements of curves and bends, both in horizontal and vertical alignment.
 - e. Location of mitered pipe sections, beveled ends and/or pulled joints for alignment conformance, butt straps, and deep bell lap joints for temperature stress control.
 - f. Location of closures, cutoff sections for length adjustment, temporary access manways, vents, and weld lead outlets for construction convenience.

- 1) Provide for adjustment in pipe laying headings and to conform to indicated stationing.
- 2) Changes in location or number will require ENGINEER approval.
- g. Location of bulkheads, both those shown and as required, for hydrostatic testing of pipeline.

C. Welding Procedure Specification (WPS):

1. Qualified by testing in accordance with ASME BPVC SEC IX for shop welds and AWS D1.1 for field welds.
2. PQRs conducted on unlisted base metal (most coil products are unlisted base metals) to be production welded as required in the referenced welding Code shall be traceable to heat lots.
3. Written WPS required for welds, both shop and field.
4. Notch-tough welding that requires heat input control is required for welding of pipe and/or crotch plates with thickness equal to 7/16-inch or greater:
 - a. AWS D1.1 prequalified welding procedures are not allowed.
 - b. WPS used to shop fabricate pipe shall be qualified in accordance with ASME BPVC SEC IX and shall include Supplementary Essential Variables.
 - c. Qualify WPS used to install pipe in the field for heat input control in accordance with AWS D1.1.
 - d. Qualify PQRs for notch tough welding with consideration for thickness of steel, test temperature, and Charpy V-notch CVN values. Refer to AWS D1.1, Annex III Requirements for CVN Testing, Option A (three specimens). Using this test procedure select test temperature and minimum average energy level for Charpy Testing, the welding position as it may relate to heat input on the heat affected zone (HAZ) test results, and the orientation of the test plates as these relate to the longitudinal or transverse properties of the HAZ. See Part 2, Products, Article Pipe Barrel for Charpy V-notch acceptance criteria.

- D. Stulling (Strutting): Design stulling for pipe, specials, and fittings such that over-deflection and damage is avoided during handling, storage, and installation, including backfill and compaction.

5.01 SUBMITTALS

- A. Shop Drawings: Submit shop drawings of steel pipe, specials and fittings in accordance with the requirements in Section 108.19, Shop Drawings And Submittals, and the following supplemental requirements as applicable. Submittals for steel pipe and steel pipe specials shall be prepared and submitted by a single pipe supplier only. The supplier responsible for preparation of the material shall be the MPS.
- B. Action Submittals:
1. Shop Drawings showing pipe layout as described in Paragraph 1.04.B, Pipe Layout.
 2. Material list and steel reinforcement schedules for materials specified.
 3. Fabrication Information:
 - a. Pipe and fitting details for temporary and permanent facilities indicating:
 - 1) Cylinder thickness.
 - 2) The position, type, size and area of reinforcement.
 - 3) Manufacturing tolerances.
 - 4) Maximum angular deflection limitations of field joints.
 - 5) Closure sections and cutoffs for field length adjustment.
 - 6) Bulkheads, including details for removal of test bulkheads and repair of lining.

- 7) Weld lead outlets and plugs.
 - 8) Stulling size, spacing, and layout.
 - 9) All other pertinent information required for the manufacture and installation of the product.
 - b. Welded joint details including:
 - 1) Butt joints.
 - 2) Miter-cut ends for alignment conformance.
 - 3) Lap joints.
 - 4) Deep bell lap joints required for control of temperature stresses.
 - 5) Butt strap joints.
4. Welding Data (Shop and Field Welding):
 - a. Show on a weld map, location, type, size, and extent of welds with reference called out for WPS and NDE numbers in tail of welding symbol.
 - b. Distinguish between shop and field welds.
 - c. Indicate, by welding symbols or sketches, details of welded joints and preparation of base metal.
 - d. Welding and NDE symbols shall be in accordance with AWS A2.4.
 - e. Welding terms and definitions shall be in accordance with AWS A3.0.
5. Product data for the following:
 - a. Pipe:
 - 1) Material data.
 - 2) Chemical and physical test reports showing data consistent with specified requirements for each heat of steel proposed for use. Provide prior to ordering coil.
 - b. Coatings and Linings:
 - 1) Technical data sheets itemizing chemical composition, technical and performance information that indicates compliance with this Specification.
 - 2) Color chart, if applicable.
 - 3) Manufacturer's name, product number or name, and thickness.
 - c. Flanged Joints:
 - 1) For Each Flanged Connection: Reference standard, dimensional data, bolt hole number, pattern and diameter, bolt diameter and length, face condition (raised or flat).
 - 2) Gaskets and Bolting: Technical data sheets itemizing chemical composition, technical and performance information that indicates compliance with this Specification.
 - d. Wall Sleeves: Dimensional data, including sleeve length, thickness, and diameter.
6. Pipe handling equipment and methods for loading and unloading pipe.
7. UTILITIES-approved water quality laboratory testing services with hydrostatic testing.

C. Informational Submittals:

1. Certificates:
 - a. Manufacturer's Certificate of Compliance that products furnished meet requirements of this Specification.
 - b. Lining Materials: Certificate that lining system is currently approved for potable water contact in accordance with NSF 61 and satisfies current applicable governmental health and safety requirements for use in potable water.
 - c. Steel Pipe Installation: Certificate that training has been provided to CONTRACTOR's installation crews regarding proper pipe handling and storage procedures.
2. MPS's written Quality Assurance/Control (QA/QC) Plan.

- a. The MPS's QA/QC program shall ensure the achievement of adequate quality throughout applicable areas of the Contract.
 - b. The QA/QC Plan shall describe and define the QA/QC staff, their qualifications, their functional roles, and authorities.
 - c. The QA/QC Plan shall describe the program and include the items specified under Paragraph 1.06.H, to include:
 - 1) Identification and control of items and materials.
 - 2) Inspection and tests.
 - 3) Control of measuring and test equipment.
 - 4) Supplier quality assurances.
 - 5) Nonconformances and corrective action.
 - 6) Special processes and personnel qualifications.
 - 7) Program audits.
 - 8) Documented control/quality records.
3. Statements of Qualification:
- a. Pipe manufacturer.
 - b. Fittings and specials fabricator.
 - c. Welders or Welding Operators:
 - 1) Name of welder.
 - 2) Welding procedures/positions for which welder is qualified to weld.
 - 3) Assigned certification stamp number.
 - 4) Certification date.
 - 5) Current certification status.
 - d. Certified Welding Inspector (CWI) for shop welding.
 - e. NDT Quality Control Personnel.
4. Procedures:
- a. Shop and field welding information: At a minimum include a complete welding code paper trail with linkage to Shop Drawings that includes the following:
 - 1) Written WPS and PQR.
 - a) Provide complete joint dimensions and details showing bevels, groove angles, root face, and root openings for all welds.
 - b) Notch-tough welding is required when steel thickness exceeds 7/16-inch. For shop welding, address supplementary essential variables in addition to essential variables as indicated in ASME Section IX, QW-251.2. For field welding, heat-input, control PQR essential variables as indicated in AWS D1.1 shall be included. For shop and field welding, provide heat-input table on WPSs for welder guidance.
 - c) PQRs for notch-tough welding shall document heat-input control by monitoring volts, amps, and travel speed or time-rate of change of weld metal volume as calculated by measuring change in electrode length over a period of time. Charpy V-notch tests shall be conducted on weld metal and heat affected zone. Test coupons shall be oriented transverse to final direction of rolling. Full size Charpy specimen test acceptance shall be same as base metal specified herein.
 - 2) Written NDT procedures.
 - 3) Current WPQ.
 - b. Written description of proposed sequencing of events or special techniques including:
 - 1) Temperature stress control for pipe wall during installation.
 - 2) Minimizing distortion of steel.
 - 3) Monitoring pipeline temperatures during installation.
 - 4) Shop-Applied Cement-Mortar Lining: Include description of machine to be used and list of similar project where machine was used. Identify pipe size and total footage.

- 5) Written weld repair procedures for the Work.
 - 6) Field coating application and repair.
 - 7) Field lining application, repair, and moisture control in accordance with AWWA C602 or AWWA C222.
 - 8) Written consumable control procedure for welding materials demonstrating:
 - a) How consumables will be stored to comply with manufacturer's written instructions.
 - b) How consumables will be dried in ovens prior to use.
 - c) How consumables which become wet will be reconditioned.
5. Design Calculations:
- a. Fittings and Specials: Design calculations for fittings and specials including outlet reinforcement details of collars, wrappers, and crotch plates as required. Calculations to be sealed by a Colorado Registered Professional Engineer.
6. Reports:
- a. Source Quality Control Test Reports:
 - 1) Hydrostatic testing.
 - 2) Destructive weld testing.
 - 3) Nondestructive weld testing.
 - 4) Steel impact testing using Charpy V-notch method.
 - 5) Coating and lining factory site visit letter by qualified manufacturer's technical representative.
 - b. Field Quality Control Test Reports:
 - 1) Weld tests, including initial weld examination and re-examination of repaired welds, on each weld joint for the following tests, as applicable:
 - a) Visual Testing (VT).
 - b) Radiographic Testing (RT).
 - c) Ultrasonic Testing (UT).
 - d) Magnetic Particle Testing (MT).
 - e) Liquid Penetrant Testing (PT).
 - f) Leak Testing (LT).
 - 2) Coating and lining site visit letter by qualified technical representative.
 - 3) Applicator's quality control records, including environmental conditions, dry film thickness, and adhesion tests, when requested by ENGINEER.
 - c. Cement-mortar lining compressive strength tests in accordance with AWWA C205.
 - d. Cement-mortar coating absorption tests in accordance with AWWA C205.
 - e. Field-applied cement mortar lining moisture control in accordance with AWWA C602.
7. Field Testing Plan: Submit at least 15 days prior to testing and include at least the following information:
- a. Testing dates.
 - b. Piping system and sections to be tested.
 - c. Method of isolation.
 - d. Method of conveying water from source to system being tested.
 - e. Calculation of maximum allowable leakage for piping sections to be tested.

6.01 QUALITY ASSURANCE

A. Qualifications:

1. Pipe Manufacturer:
 - a. Experienced in fabricating pipe of similar diameters, lengths, and wall thickness required for the Work.

- b. Steel Pipe Fabricators Association (SPFA), Lloyd's Registry Certification, or ISO 9000 Certification.
 - c. Demonstrate current production capability for volume of work required for this Project.
 - d. Experience shall include successful fabrication to AWWA C200 standards of at least 100,000 linear feet of 24-inch diameter or larger pipe, with wall thickness of 0.200 inches or greater, within past 5-year period.
 - e. Experience shall be applicable to fabrication plant facilities and personnel, not company or corporation that currently owns fabrication facility or employs personnel.
 - 2. Fittings and Specials Fabricator:
 - a. Experienced in fabricating fittings and specials of similar diameters and wall thickness required for the Work.
 - b. Steel Pipe Fabricators Association (SPFA), Lloyd's Registry Certification, or ISO 9000 Certification.
 - c. Demonstrate current production capability for volume of work required for this Project.
 - d. Experience shall include successful fabrication to AWWA C200/C208 standards of at least 100 fittings of 24-inch or larger pipe, with wall thickness 0.200 inch or greater, within past 5-year period.
 - e. Experience shall include successful fabrication of at least five crotch plate fittings or specials within past 5-year period.
 - f. Experience shall be applicable to fabrication shop facilities and personnel, not company or corporation that currently owns fabrication facility or employs personnel.
 - 3. Welders and Welding Operators:
 - a. Shop Welders: In accordance with ASME BPVC SEC IX.
 - b. Field Welders: In accordance with AWS D1.1/D1.1M.
 - 4. Certified Welding Inspector (CWI):
 - a. In accordance with AWS QC 1, with knowledge of appropriate welding code for the Work.
 - b. After receiving CWI qualification, CWI shall have at least 5 years of professional experience related to welding inspection similar to the Work.
 - 5. NDT Quality Control Personnel:
 - a. In accordance with requirements of ASNT Recommended Practice No. SNT-TC-1A, Level II.
 - b. After receiving NDT qualification, NDT personnel shall have at least 5 years of professional experience related to NDT inspection similar to the Work.
- B. Certified Welding Inspector (CWI) For Shop Welding:
- 1. CONTRACTOR will provide CWI.
- C. Field Welder Qualifications and Testing:
- 1. Field welding procedures, welders, and welding operators shall be qualified in accordance with AWS D1.1. Qualifications shall be in accordance with all-position pipe tests as defined in Section 4 of AWS D1.1.
 - 2. Conduct welder qualification testing for field welding at the project site. Results of previous qualification tests will not be accepted. UTILITIES will provide the services of an independent testing laboratory to perform the welder qualification. Submit copies of all test data and certifications to ENGINEER.
- D. Certified Welding Inspector (CWI) For Field Welding:
- 1. CONTRACTOR will provide CWI for field quality control and testing of all field welds.

- E. Prefabrication Meeting: Hold prior to fabrication of pipe, fittings, or specials between representatives of UTILITIES, CONTRACTOR, ENGINEER, and pipe fabricator to review the following:
1. Project scope.
 2. Submittal requirements.
 3. Testing.
 4. Inspection responsibilities.
 5. Shop welding requirements.
 6. Field welding requirements.
 7. Shop and field coating and lining requirements.
 8. Production and delivery schedule.
 9. Other issues pertinent to the Work.
- F. Inspection of Coating and Lining Application: Inspection requirements for pipeline coatings in accordance with the applicable pipeline coating system specification section as selected.
- G. Retain services of trained technician to test coating and lining system in shop and field in accordance with applicable pipeline coating system specification as selected. Provide certification letter that lining and coating meet specifications and include results of all specified tests.
- H. Onsite Observation of Pipe Manufacturer's Field Service Representative: The MPS shall make available an experienced staff member to be onsite when requested by CONTRACTOR and/or ENGINEER. Manufacturer's Field Services shall include a minimum of 2 person-days. MPS will be provided a minimum of 48-hour prior notification for field services. The staff member's duties shall include, but not be limited to the following:
1. Train CONTRACTOR's pipe installation crews.
 2. Inspect pipe upon delivery to site.
 3. Observe pipe handling, moving, storage, and hoisting operations.
 4. Report any concerns to the ENGINEER's onsite observer.
 5. Answer questions and provide assistance to the ENGINEER and the CONTRACTOR.
 6. Inspection and certification of field mortar lining repair and dielectric coating repair of pipe, fittings, or specials when requested.
 7. MPS's written Quality Assurance/Control (QA/QC) Plan.
 8. Only CONTRACTOR's personnel that have been trained by the Pipe Manufacturer's Field Service Representative in field coating operations shall be permitted to perform this work. If crew makeup changes, Pipe Manufacturer's Field Service Representative shall train replacements.
- I. QA/QC Plan Minimum Requirements:
1. The QA/QC Plan shall describe and define the personnel requirements described herein. The MPS shall provide personnel with assigned QA/QC functions reporting to a Field QA/QC representative. The Field QA/QC representative shall report to a Senior Manager of the MPS and shall have no supervisory or managerial responsibility over the work force. Persons performing QA/QC functions shall have sufficient qualifications, authority, and organizational freedom to identify quality problems and to initiate and recommend solutions. The MPS QA/QC representative(s) shall be on the Site as often as necessary (but not less than the daily hours specified in the Contract Documents) to remedy and demonstrate that Work is being performed properly and to make multiple observations of Work in progress. The QA/QC Plan shall include a statement by the Senior Manager

designating the QA/QC representative and specifying authorities delegated to the QA/QC representative to direct cessation or removal and replacement of defective Work.

2. The MPS's QA/QC program shall ensure the achievement of adequate quality throughout applicable areas of the Contract. The QA/QC Plan shall describe the program and include procedures, work instructions and records. In addition, the Plan shall describe methods relating to areas which require special testing and procedures as noted in the Specifications.
3. Identification and Control of Items and Materials: Procedures to ensure that items or materials that have been accepted at the manufacturing site are properly used and installed shall be described in the QA/QC Plan. The procedures shall provide for proper identification and storage, and prevent the use of incorrect or defective materials.
4. Inspection and Tests:
 - a. The MPS shall have written procedures defining a program for control of inspections performed and these procedures shall be described in the QA/QC Plan.
 - b. Inspections and tests shall be performed and documented by qualified individuals. At a minimum, "qualified" shall mean having performed similar QA/QC functions on similar type projects. Records of personnel experience, training and qualifications shall be maintained and made available for review by the ENGINEER upon request.
 - c. The MPS shall maintain adequate records of all such inspections and tests. Inspection and test results shall be submitted.
 - d. Procedures shall include:
 - 1) Specific instructions defining procedures for observing work in process and comparing this work with the Contract requirements (organized by specification section).
 - 2) Specific instructions for noting deficiencies and steps to be taken to have the deficiency corrected, repaired, or replaced.
 - 3) Specific instructions for recording observations and requirements for demonstrating through the reports that the Work observed was in compliance or a deficiency was noted and action to be taken.
 - 4) Procedures to preclude the covering of deficient or rejected Work.
 - 5) Procedures for halting or rejecting Work.
 - 6) Procedures for resolution of differences between the QA/QC representative(s) and the production representative(s).
 - e. QA/QC Plan shall identify contractual hold/inspection points, as well as any MPS imposed hold/inspections points.
 - f. The QA/QC Plan shall include procedures to provide verification and control of testing provided by MPS including:
 - 1) Verifying and noting on Daily Report all required testing was performed and documenting results if available. (Include a sample of the MPS's Daily Report).
 - 2) Provide location maps for all tests performed or location of Work covered by the tests.
 - 3) Maintaining copies of all test results.
 - 4) Submitting all tests.
 - 5) Ensuring ENGINEER receives independent copy of all tests.
 - 6) Ensuring testing lab(s) are functioning independently and in accordance with the Specifications.
 - 7) Ensuring re-tests are properly taken and documented.
5. Control of Measuring and Test Equipment: Measuring and/or testing instruments shall be adequately maintained, calibrated and adjusted to maintain accuracy within prescribed limits. Calibration shall be performed at specified periods against valid standards traceable to nationally recognized standards and documented.

6. Supplier Quality Assurance: The QA/QC Plan shall include procedures to ensure that procured products and services conform to the requirements of the Specifications. Requirements of these procedures shall be applied, as appropriate, to lower-tier suppliers and/or Subcontractors.
7. Nonconformances and Corrective Action: The QA/QC Plan shall include procedures for handling of nonconformances. Nonconformances are defined as documentation, drawings, material, equipment or Work not conforming to the specified requirements or procedures. The procedure shall prevent the use of nonconformances by identification, documentation, evaluation, separation, disposition and corrective action to prevent recurrence. Conditions having adverse effects on quality shall be promptly identified and reported to the senior level management. The cause of conditions adverse to quality shall be determined and documented and measures implemented to prevent recurrence.
8. Special Processes and Personnel Qualifications:
 - a. The QA/QC Plan shall include detailed procedures for the performance and control of special process (e.g. welding, soldering, heat treating, cleaning, plating, nondestructive examination, etc.).
 - b. Personnel performing special process tasks shall have the experience, training and certifications commensurate with the scope, complexity, or nature of the activity.
9. Audits: The MPS's QA/QC program shall provide for documented audits to verify that QA/QC procedures are being fully implemented by the MPS as well as its subtiers. Audit records shall be made available to the ENGINEER upon request.
10. Documented Control/Quality Records:
 - a. The MPS shall establish methods for control of Contract Documents which describe how Drawings and Specifications are received and distributed to assure the correct issue of the document being used.
 - b. The MPS shall maintain evidence of activities affecting quality, including operating logs, records of inspections and tests, audit reports, material analyses, personnel qualification and certification records, procedures, and document review records.
 - c. Quality records shall be maintained in a manner that provides for timely retrieval, and traceability. Quality records shall be protected from deterioration, damage, and destruction.
 - d. The MPS shall provide a list with specific records as specified in the Contract Documents for submittal at the completion of activities.
11. Acceptance of QA/QC Plan:
 - a. ENGINEER's review and acceptance of the MPS's QA/QC Plan shall not relieve the MPS from any of its obligations for the performance of the Work. The MPS's QA/QC staffing is subject to the ENGINEER's review and continued acceptance. UTILITIES, at sole option, without cause, may direct the MPS to remove and replace the QA/QC representative. No Work covered by the QA/QC Plan shall start until ENGINEER's acceptance of MPS's QA/QC plan has been obtained.
 - b. ENGINEER may perform independent quality assurance audits to verify that actions specified in MPS's QA/QC Plan have been implemented. No ENGINEER audit finding or report shall in any way relieve MPS from any requirements of this Contract.

7.01 DELIVERY, HANDLING, AND STORAGE

A. Pipe Marking:

1. Legibly mark installation sequence number on pipe, fittings, and specials in accordance with piping layout.
2. Mark special pipe sections and fittings at each end with notation "TOP FIELD CENTERLINE".

3. Paint or mark the word "TOP" on outside top spigot of each pipe section.
4. Mark "TOP MATCH POINT" for compound bends per AWWA C208 so end rotations can be easily oriented in field.
5. Mark the maximum joint insertion point on the spigot end with a circumferential line.

B. Delivery

1. Securely bulkhead or otherwise seal ends of pipe, specials, and fittings prior to loading at manufacturing site.
2. Pipe ends shall remain sealed until installation.
3. Unload pipe using equipment and methods as approved by MPS and in accordance with MPS pipe handling submittal.
4. Inspect each pipe and fitting for damage. Remove or smooth out any burrs, gouges, weld splatter or other small defects prior to laying the pipe.
5. Damage to pipe, fittings, or specials, including linings and coatings, found upon delivery to jobsite shall be repaired or removed from site and replaced at no increased cost to UTILITIES.

C. Storage:

1. Support pipe securely to prevent accidental rolling and to avoid contact with mud, water, or other deleterious materials. Support on sand or earth berms free of frozen material and rock exceeding 3 inches in diameter.
2. Carefully handle and protect pipe, fittings, and specials against damage to lining and coating/interior and exterior surfaces, impact shocks, and free fall. Pipe handling equipment shall be submitted and accepted by ENGINEER. Do not place pipe directly on rough ground but support at the 1/3 and 2/3 points along the length of the pipe section in a manner which will protect the pipe against injury whenever stored at the trench site or elsewhere.
3. Damage to pipe, fittings, or specials, including linings and coatings, found in stored pipe shall be repaired in accordance with manufacturer's instructions or removed from site and replaced at no increased cost to UTILITIES.
4. Gasket Storage: Store rubber gaskets in cool, well ventilated place, and do not expose to direct rays of sun. Do not allow contact with oils, fuels, petroleum, or solvents.
5. Pipe and Specials Protection: Protect with suitable bulkheads the openings of pipe and specials where the pipe and specials have been cement-mortar lined in the shop to maintain a moist atmosphere and to prevent unauthorized access by persons, animals, water or any undesirable substance. Maintain bulkheads, fix tears or replace bulkheads damaged. Introduce water into the pipe to keep the mortar moist where moisture has been lost due to damaged bulkheads.

8.01 SEQUENCING AND SCHEDULING

A. Notify ENGINEER in writing of the following pipe manufacturing events:

1. Pipe Manufacturing: Not less than 14 days prior to starting.
2. Not less than 5 days prior to start of each of the following:
 - a. Welding of specials.
 - b. Coating application.
 - c. Lining application
 - d. Shop hydrostatic testing.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Manufacture of pipe and fabricated specials shall be under the direction and management of one steel pipe supplier only. This does not prevent a separate supplier from manufacturing specials or fittings; however, all Work shall be directed by the MPS. The responsibility of the MPS shall include, at a minimum:
 - 1. Ensure pipe, fittings, and specials are being manufactured in full accordance with the Drawings and Specifications.
 - 2. Manage the design and fabrication of the pipe and specials.
 - 3. Prepare and submit submittal information and shop drawings.
 - 4. Make any corrections that may be required to the submittal information and shop drawings.
 - 5. Certify that the pipe and specials have been manufactured in accordance with the Specifications and Drawings.
- B. Steel pipe, fittings, and specials shall be manufactured, tested, inspected, and marked to comply with AWWA C200, C208 and additional requirements of these Contract Documents. The pipe shall be of outside diameter and wall thickness equal to or greater than the existing pipe being connected. Records indicate the existing pipe is ASTM A1011/A1011M-12 SS Grade 36 Type 2 (modified), with an outside diameter (OD) of 25.375 inches and a wall thickness (t) of 0.175 inches. The contractor shall field verify the diameter and wall thickness of the existing pipe prior to preparation of shop drawings.
- C. In lieu of collar reinforcement, pipe, fittings, or specials with outlets may be fabricated in their entirety of steel plate having thickness equal to sum of pipe wall plus required reinforcement.
- D. Unless shown otherwise, for pipes 24 inches and larger in diameter, the diameter shown shall be considered finished inside diameter after lining. For pipes smaller than 24 inches in diameter, the diameter shown shall be per ANSI B36.10M. According to this standard, pipe size shall be the nominal outside diameter for 14-inch diameter pipe and larger, and pipe size shall be the nominal inside diameter for 12-inch diameter pipe and smaller.
- E. Materials furnished shall be NSF 61 approved for use with potable water.

2.2 PIPE BARREL

- A. Steel: Provide steel coils for spiral welded steel pipe or steel plate for straight seam welded steel pipe per AWWA C200 and as follows:
 - 1. Minimum Yield Strength: 42,000 psi.
 - 2. Minimum Tensile Strength: 60,000 psi.
 - 3. Maximum Measured Yield Strength: 85 percent of measured tensile strength.
 - 4. Minimum Elongation in 2-inch Gauge Length: 21 percent.
 - 5. Weld-Ability: Maximum carbon equivalent of 0.45, as measured using AWS D1.1, Annex XI, Guideline on Alternative Methods for Determining Preheat formula: $CE = C + (Mn + Si)/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15$.
 - 6. Pressure Vessel Quality as follows:
 - a. Coils:
 - 1) Continuous cast process, fully killed, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A139, Grade C or Grade D; ASTM A1018/A1018M, Structural Steel (SS) Grade 36 or 40, Type 2 (modified); or ASTM A1011, Structural Steel (SS) Grade 36, Type 2

- b. Plate:
 - 1) Fully-killed, conforming to ASTM A20, fine grained practice conforming to physical, manufacturing and testing requirements of ASTM A516/A516M, Grade 70.
 - 2) Steel Chemistry: Conform to ASTM A516/A516M, Grade 70. Steel plates that are 3/4 inch thick or greater shall be normalized.
- c. Toughness:
 - 1) Charpy V-notch Acceptance Criteria (Steel Mill): Wall thickness equal to or greater than 0.4375 inches. Transverse specimen orientation, full size specimens, 25 foot-pounds energy at test temperature of 30 degrees F.
- 7. Wall Thickness:
 - a. Minimum wall thickness is to match the existing pipe with zero inch minimum fabrication tolerance.
 - b. When not shown on Drawings, use standard weight in accordance with ANSI/ASME B36.10M.

2.3 FITTINGS AND SPECIALS

- A. Fabrication:
 - 1. Shop fabricate. No field fabrication will be allowed, unless approved by ENGINEER.
 - 2. Fabricate from materials or straight pipe in full conformance with requirements of these Contract Documents and dimensions of AWWA C208, unless otherwise indicated.
- B. Crotch Plate: Fabricate from fully killed, fine grain, pressure vessel steel conforming to ASTM A516/A516M, Grade 70, and as follows:
 - 1. Plates thicker than 0.75 inches shall be normalized.
 - 2. Sulfur content shall not exceed 0.005 percent. Carbon shall not exceed 0.20 percent. Manganese shall not exceed 1.20 percent.
 - 3. Charpy V-notch tests in direction transverse to final rolling shall be performed per ASTM A370 on full size specimens of coupons taken from each plate. Acceptance shall be 25 foot-pounds at 30 degrees F.
 - 4. Carbon equivalent shall not exceed the value in Table 2 of ASTM A20.
- C. Wall Thickness:
 - 1. General:
 - a. Refer to ANSI/ASME B36.10M for definitions of wall thickness for standard weight pipe and nominal pipe size (NPS).
 - b. Reinforce to withstand either internal pressures, both circumferential and longitudinal, or external loading conditions, whichever is greater.
 - c. Minimum Thickness: The greater of adjacent mainline pipe, the thickness shown on the Drawings, the thickness specified below for elbows, or as shown in Table 1.

Table 1		
12" and Under	Standard Weight	Standard Weight

- D. Elbows, Unless Otherwise Indicated:

1. Mainline Pipe: Radius shall not be less than 2.5 times pipe diameter unless specifically indicated on Drawings.
2. Radius Less than 2.5 Times Pipe Diameter:
 - a. Only where indicated on Drawings.
 - b. Minimum Radius: 1.0 times pipe diameter.
3. Minimum Bend Wall Thickness: Greater of Table 1 above or as calculated using the equations in Chapter 9 of AWWA M11.
4. Maximum Miter Angle: 11-1/4 degrees on each section resulting in a maximum deflection angle of 22.5 degrees per miter weld as recommended in AWWA C208.
5. Complete joint penetration (CJP) welds on miter welds.

E. Outlets:

1. 12 Inches and Smaller: Fabricate from ASTM A53/A53M, Type E or S, Grade B, standard weight steel pipe.
2. 24 Inches: Steel material shall conform to the requirements of Article 2.02
3. Collar or wrapper reinforcement: Steel material shall conform to the requirements of Article 2.02.
4. Outlets for NF pipeline shall be designed for Templeton working pressures.

F. Steel Butt-Weld Fittings:

1. 12 Inches and Smaller: In accordance with ANSI/ASME B16.9 conforming to ASTM A234/A234M.
2. Standard weight.
3. Taper pipe wall at welds at 4:1 for connection to pipe of different wall thickness.
4. Coordinate difference in diameter convention between specials and AWWA C200/C208 pipe and fittings to provide complete piping system as shown.

2.4 WELDED JOINTS

A. Shop Welded:

1. Fabricate in accordance with AWWA C200 as modified herein.
2. Complete joint penetration (CJP) butt joints shall be used for longitudinal, girth, and spiral welds, unless otherwise indicated.
3. Lengths of pipe shall not be shop-joined using lap joints.

B. Preparation of Joints for Field Welding:

1. Butt Joint Welded: Plain ends beveled as required by AWWA C200 and CONTRACTOR's field WPS.
2. Lap Joint Welded:
 - a. For 24-inch nominal and smaller diameter steel pipe: Single fillet lap joint is the standard joint, unless otherwise indicated.
 - b. For 30-inch nominal and larger diameter steel pipe: Double fillet lap joint is the standard joint, unless otherwise indicated.
 - c. Fillet lap joints in preparation for field welding shall be in accordance with the Drawings and AWWA C200.
 - d. Double welded lap joints and butt-strap joints shall be tapped and drilled for testing from the outside in accordance with AWWA C206.

C. Beveled Ends (Mitered-End Cuts):

1. As shown on Drawings.
2. Moderate deflections and long radius curves may be made using beveled ends with the maximum total allowable angle as indicated.

3. Use only with lap welded joints, unless specifically approved in writing by ENGINEER.
 4. Maximum Total Allowable Angle: 5 degrees per pipe joint.
 5. Combining miters and field joint pulls with shop fabrication will not be accepted without prior ENGINEER approval.
 6. Provide miter-cut that is cold expanded square with face of miter-cut on bell ends only.
 7. Mitering of spigot ends will not be permitted.
- D. Temperature Control Lap Joint: Provide a special longer bell end (temperature control lap joint) at a maximum spacing of 300 feet to account for movement of the installed pipe due to temperature changes. The pipe manufacturer shall determine the length required for the longer bell. Minimum temperature control lap joint length is a minimum of 3 inches longer than standard lap.

2.5 STULLING (STRUTTING)

- A. Materials:
1. Shop-Lined Pipe: Wood stulls and wedges.
 2. Unlined Pipe: Steel or wood.
- B. Install stulling in 30-inch and larger pipe, specials, and fittings in accordance with approved submittal and as soon as practical after pipe is fabricated or, for shop-lined pipe, after lining has been applied.
- C. At a minimum, place one set of stulls 2 feet from each end of pipe section and at maximum interval of 15 feet.
- D. Install stulling in a manner that will not harm lining.

2.6 COATINGS

- A. General:
1. Notify ENGINEER at least 5 days prior to application of coating products.
 2. Holdback of coating from field-welded joints shall be as shown in the Contract Drawings.
 3. Furnish inspection devices that are calibrated and in good working condition for detection of holidays and measurement of coating film thickness and adhesion testing.
 4. Coat buried pipe and fittings passing through structure walls to exposed piping as indicated.
- B. Coating System: Polyurethane coating in accordance with Section 09 90 05, Polyurethane Coating.
- C. Aboveground or Exposed Pipe Coating: In accordance with Section 09 90 04, Painting, System No. 5.
- D. Field Coating of Joints: In accordance with the coating system selected for the pipe.

2.7 LININGS

- A. General:

1. Notify ENGINEER at least 5 days prior to application of lining products.
 2. Holdback of lining from field-welded joints shall be as shown in the Contract Drawings.
- B. Shop-Applied Cement-Mortar Lining:
1. Applied centrifugally in conformance with AWWA C205. Thickness shall be in accordance with AWWA C205.
 2. Lining machine type that has been used successfully for similar work and approved by ENGINEER.
 3. Maintain pipe in round condition during lining operation and thereafter by suitable bracing or strutting.
 4. Provide polyethylene or other suitable bulkhead on ends of pipe and on special openings to prevent drying out of lining. Bulkheads shall be substantial enough to remain intact during shipping and storage until pipe is installed.
 5. Pipe shall be left bare where field joints occur.
 6. Ends of lining shall be left square and uniform. Feathered or uneven edges will not be permitted.
 7. Wire mesh reinforcement required in the lining of specials shall be provided and installed in accordance with AWWA C205.
- C. Field-Applied Cement-Mortar Lining at Joints: Materials for field placement of cement-mortar lining at joints shall be in accordance with AWWA C205.

2.8 FLANGED JOINTS

- A. Flange classifications per criteria below. Flanges for NF pipeline shall be rated for Templeton working pressures,
- B. Coating for flanges and blind flanges to be in accordance with Section 09 90 04, Painting, System No. 1.
- C. For Pipe Sizes Between 4-inch and 60-inch and Maximum Working Pressures Not Exceeding 300 psig, and for Pipe Sizes Greater than 60-inch and Maximum Working Pressures Not Exceeding 275 psig: Flat-faced carbon steel or alloy flanges when mating with flat-faced cast or ductile iron flanges.
1. Conform to AWWA C207 for flanges, bolting materials, and flange gaskets.
 2. Do not expose AWWA flanges to test pressures greater than 125 percent of rated capacity.
 3. For higher test pressures, use next higher rated AWWA flange or ANSI-rated flange.
 4. Flat faces with bolt holes straddling vertical axis of pipe, unless otherwise shown.
 5. Gaskets shall be nonasbestos type and conform to AWWA C207.
- D. For Pipe Sizes Between 4-inch and 24-inch and Maximum Working Pressures Greater than 300 psig:
1. Conform to ASME B16.5, Class 300 for flanges, bolting materials, and flange gaskets.
 2. Do not expose ASME B16.5 flanges to test pressures greater than 150 percent of pressure rating.
 3. If mating to a flat face flange, remove raised face and provide flat face finish in accordance with ASME B16.5.
 4. Gaskets shall conform to ASME B16.5, Nonmandatory Appendix B, Table B-1, Group 1.

5. Bolts shall be ASTM A193, B7 stud bolts with two ASTM A194 Gr 2h heavy hex nuts.
- E. For Pipe Sizes Between 24-inch and 60-inch and Maximum Working Pressures Greater than 300 psig:
1. Conform to ASME B16.47, Class 300, Series A for flanges, bolting materials, and flange gaskets.
 2. Do not expose ASME B16.47 flanges to test pressures greater than 150 percent of pressure rating.
 3. If mating to a flat face flange, remove raised face and provide flat face finish in accordance with ASME B16.47.
 4. Gaskets shall conform to ASME B16.47, Nonmandatory Appendix B, Table B-1, Group 1.
 5. Bolts shall be ASTM A193, B7 stud bolts with two ASTM A194 Gr 2h heavy hex nuts.
- F. Blind Flanges:
1. Blind flanges shall be in accordance with the appropriate standard determined by the maximum operating pressure as described above.
 2. All blind flanges for pipe sizes 12-inches and greater shall be provided with lifting handle or lifting eyes welded to the flange, as shown in the Drawings.

2.9 COUPLINGS

- A. General:
1. Couplings shall conform to AWWA C219.
 2. Coupling linings for use in potable water systems shall be in conformance with NSF 61B.
 3. Couplings shall be rated for appropriate operating pressure.
- B. For Pipe with Flanged Ends (Dismantling Joints):
1. Self-contained flanged restrained joint fitting, including both flange components and sufficient harness bars to withstand the imposed thrust. Design pressure rating equal to or greater than flange rating.
 2. Flange Adapters and Spigot Pieces: Carbon steel, ASTM A283, Grade C. Bolt hole pattern to match connecting pipe and valves.
 3. Provide bolts, nuts, and washers (when required) of suitable quality, workmanship, and yield strength to ensure compatibility with the coupling design and rated pressure. Materials shall minimize the possibility of galvanic corrosion.
 4. Gaskets shall be elastomeric, conforming to ASTM D2000, suitable for pressure class and service.
 5. Coating for flange adapter and spigot pieces: in accordance with Section 09 90 04, Painting.
 6. Manufacturer: Viking Johnson or approved equivalent.

2.10 WELD LEAD OUTLETS

- A. Outlets for welding leads, if used, shall be at the CONTRACTOR's option and shall be indicated on the Shop Drawings.
- B. Plugs used for closing the weld lead outlets shall be suitable for the internal pressure and allow zero leakage. Weld plugs closed after completion of work.

2.11 SLAB, FLOOR, WALL, AND ROOF PENETRATIONS

A. Modular Mechanical Seal:

1. Type: Interconnected synthetic rubber links shaped and sized to continuously fill annular space between pipe and wall sleeve opening.
2. Assemble interconnected rubber links with Type 316 stainless steel bolts, nuts, and pressure plates.
3. Size modular mechanical seals according to manufacturer's instructions for the size of pipes shown to provide a watertight seal between pipe and wall sleeve opening.
4. Manufacturers and Products:
 - a. Thunderline/LinkSeal, Div. Of PSI, Houston, TX; Link Seal.
 - b. Calpico, Inc., South San Francisco, California; Sealing Linx.
 - c. Advance Products and Systems, Lafayette, Louisiana; Innerlynx.

B. Wall Sleeves:

1. Determine appropriate diameter and length from information shown on Drawings. Coordinate with modular mechanical seal manufacturer to ensure sleeve size will provide a watertight seal. Submit dimensional data per Paragraph 1.05.B.
2. Shall include integral seep ring to minimize seepage between metal sleeve and concrete.
3. Coating and lining shall be in accordance with Section 09 90 04, Painting, System No. 1.

2.12 CONCRETE FOR THRUST BLOCKS

- A. Thrust Block Concrete: As specified in Section **03 30 00, CAST-IN-PLACE CONCRETE**.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 60 deformed bars.
- C. Welded Wire Fabric: ASTM A497.

2.13 PIPE LOCATING TAPE

- A. As specified in the Colorado Springs Utilities Water Line Extension and Service Standards, Chapter 5.

2.14 PIPE BEDDING AND PIPE ZONE MATERIAL

- A. As specified in the Colorado Springs Utilities Water Line Extension and Service Standards, Chapter 5.

2.15 TRENCH STABILIZATION MATERIAL

- A. As specified in the Colorado Springs Utilities Water Line Extension and Service Standards, Chapter 5.

2.16 CATHODIC PROTECTION

- A. Provide as shown and as specified in Section 26 42 13, Passive Cathodic Protection for Underground and Submerged Piping.

2.17 SOURCE QUALITY CONTROL (PIPE MANUFACTURING)

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- A. Steel Toughness Testing for Thickness Equal to or Greater than 0.4375-Inch:
1. Include three impact specimens; conduct test in direction transverse to final direction of rolling.
 2. Coils:
 - a. Conduct Initial Charpy Testing of each coil of each heat to establish uniformity of steel followed by Production Charpy Testing where random coil from each heat is selected to verify consistency.
 - b. Conduct Initial Charpy Testing of 25 percent of steel for pipe and specials. Take test coupons from each coil of each heat at locations of outer, middle, and inner wrap of coil. Middle coil test coupons may be taken from ends of full-length pipes that are closest to middle of coil.
 - c. Conduct Production Charpy Testing on random coil of each heat on 75 percent of steel for pipe and specials. Take test coupons from each coil of each heat at locations of outer, middle, and inner wrap of coil. Middle coil test coupons may be taken from ends of full-length pipes that are closest to middle of coil.
 - d. Coils that do not qualify shall not be used in production of pipe.
 3. Plate:
 - a. Conduct Charpy Tests on each plate in accordance with ASTM A20.
 - b. Conduct on full-size (10 mm by 10 mm) specimens from each plate in accordance with ASTM A20.
 - c. Plates that do not qualify shall not be used in production of pipe.
- B. Crotch Plate:
1. Through-Thickness tension testing shall be performed with acceptance criteria per Article 5 of ASTM A770/A770M on each plate.
 2. Straight-Beam Ultrasonic Examination shall be conducted with acceptance criteria per Article 6 of ASTM A435/A435M on each plate.
 3. Plates that do not qualify shall not be used.
- C. Shop Hydrostatic Pressure Test: In accordance with AWWA C200 Section 5.2, except as follows:
1. General: Unless specified otherwise, testing of pipe, fittings, and specials shall be performed before lining and coating is applied.
 2. Fittings and Specials:
 - a. If fabricated from untested straight pipe, test to minimum pressure equal to field test pressure.
 - b. Except as otherwise specified herein, no additional shop hydrostatic test will be required on fittings and specials fabricated from successfully tested straight pipe and where new welds are tested as specified.
 - C.** Hydrostatically test fittings and specials with crotch plates, regardless of whether or not straight pipe sections used were previously tested.
- D. Joints, Lap-Welded:
1. Fit test minimum of five joints, selected by ENGINEER, of each pipe size used:
 - a. Join pipe ends with proposed adjacent pipe end.
 - b. Match-mark pipe ends.
 - c. Record Actual Annular Space:
 - 1) Maximum space at any point.
 - 2) Minimum space at any point.
 - 3) Space at 90-degree intervals; top, bottom, and spring line on both sides.

E. Shop Nondestructive Testing:

1. Welds: 100 percent visually examined by CWI to criteria in ASME BPVC SEC VIII, Division 1.
2. Butt-Joint Welds: Spot radiographically examine pipe in accordance with ASME BPVC SEC VIII, Div. 1, Par. UW-52 or 100 percent ultrasonically examine.
3. Fillet Welds: 100 percent examine using magnetic particle inspection method in accordance with ASME BPVC SEC VIII, Division 1.
4. Groove Welds: 100 percent ultrasonically examine or radiographically spot examined in accordance with ASME BPVC SEC VIII, Division 1.
5. Air test collars and wrappers in accordance with AWWA C206.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install piping complete with jointing materials and accessories, anchors, and other appurtenances.
- B. Prepare trench as specified in the Colorado Springs Utilities Water Line Extension and Service Standards Chapter 5. Keep trench dry until pipe laying and joining is completed.
- C. Unless otherwise permitted by ENGINEER, maximum length of open trench shall not exceed 300 LINEAR feet.
- D. Stulling:
 1. Maintain stulling in place until pipe is placed in trench.
 2. Vertical stulls shall remain in place until pipe is completely backfilled and compacted.
 3. Re-install stulls that were temporarily removed to facilitate interior welding prior to backfilling.

3.2 LAYING PIPE

- A. Trenching, embedment, and backfilling of buried piping shall conform to the Colorado Springs Utilities Water Line Extension and Service Standards, Chapter 5, and to the details indicated on the Drawings. Do not install pipe when water is in the trench.
- B. Before placement of pipe in the trench, ensure each pipe or fitting is clean of any foreign substance, keep clean thereafter. For this purpose, the openings of pipes and fittings in the trench shall be covered during non-working hours.
- C. Pipe shall be handled with proper equipment in a manner to prevent distortion or damage. Use of hooks, chains, wire ropes, or clamps that could damage pipe, damage coating or lining, or kink and bend pipe ends is not permitted. Use heavy canvas, or nylon slings of suitable strength for lifting and supporting materials.
- D. Lift pipe during unloading or lifting into trench using one or more slings as required to prevent uncontrolled swinging, damage to pipe, or harm to workers. Slings shall bear uniformly against pipe.
- E. If pipe zone material is CLSM, lay pipe directly on moist sand bag supports in preparation for CLSM. Place sand bag supports to provide at least 6 inches of CLSM below bottom of pipe. Space supports at a maximum interval of 8 feet and one set within 3 feet on both sides of each joint. Provide additional sand bags as needed to support pipe on line and grade.

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- F. Form bell holes at the ends of pipe to prevent point loading at the bells or couplings. Make excavation outside normal trench section at field joints for field connections and application of coatings.
- G. Lay each section of pipe in the order and position shown on the shop drawings and pipe layout. Lay to the set line and grade. Installation tolerances shall be as hereinafter specified.
- H. Out-of-Round Pipe: Straight pipe that deviates from a true circle by more than 1 percent shall be laid with its larger diameter vertical, or by using struts on continuous head and sill timbers to correct the vertical diameter where acceptable to the ENGINEER. Final inspection, repair, and checking of interior lining shall be performed after the struts have been removed.
- I. Horizontal deflections or fabricated angles shall fall on alignment, as shown except as may be required for beveling a single end either side of a deflection.
- J. Vertical deflections shall fall on alignment, and pipe angle point locations shall match those indicated on Drawings.
- K. Where necessary to raise or lower the pipe due to unforeseen obstructions or other causes, the ENGINEER may change the alignment and/or the grades. Make changes by the deflection of joints, by the use of beveled joints, or by the use of fittings. No joint shall be misfit any amount that will be detrimental to the strength and water tightness of the finished joint, including the strength and water tightness of the protective lining at the finished joint.
- L. Make minor field adjustments by pulling standard joints. The allowable deflection of field joints is as follows:
 - 1. Maximum Allowable Angle: 75 percent of manufacturer's recommended, or angle that results from 3/4-inch pull out from normal joint closure, whichever is less.
 - 2. Maximum Allowable Gap: 1/8 inch between bell and spigot at weld location.
 - 3. No minor deflections (pulls) shall be allowed at beveled ends.
- M. For grades exceeding 10 percent lay pipe in an uphill direction except for short runs that may be permitted by the ENGINEER. Block pipe which is laid on a downhill grade and hold in place until sufficient support is furnished by the following pipe to prevent movement.
- N. Whenever pipe laying is stopped at the end of the day, seal the open end of the line to prevent entry by animals, dirt, and debris. Maintain continuous dewatering when necessary to prevent groundwater or surface water from entering the pipeline. Water shall be removed from the trench to the level indicated in the Colorado Springs Utilities Water Line Extension and Service Standards, Chapter 5, prior to resuming pipe laying operations.
- O. Alignment and Grade:
 - 1. Lay pipe to the lines and grades indicated on the Drawings. Pipelines or runs intended to be straight shall be laid straight. Curves in push-on joint pipe may be formed by opening the joint. Maximum joint openings and deflections shall be 75 percent of that recommended by the pipe manufacturer. In welded pipe, deflections up to 3.0 degrees at a single joint may be made by factory-mitering the bell end of one pipe.

2. Survey equipment shall be used to indicate alignment and grade. Take at least one elevation reading on each length of pipe. Make periodic elevation measurements with surveying instruments to verify accuracy of grades.
3. Verify survey set up at least daily using an independent benchmark or temporary benchmark.

P. Tolerances:

1. Alignment and Grade Tolerances:
 - a. Plus or minus 0.05 foot in grade. High and low points will not be acceptable, except where indicated on the Drawings.
 - b. Plus or minus 0.20 foot in alignment, except where indicated differently on the Drawings.
2. Observe stricter tolerances than specified above as necessary to maintain minimum cover, to maintain required clearances, to place carrier pipe inside the casing pipe, to make pipe connections to existing piping, to maintain the correct slope in the run to prevent high or low points along the pipeline other than those locations indicated on the Drawings.

Q. Protection of Pipe: Take precautions to protect the pipe from damages at locations where the CONTRACTOR proposes to cross the installed pipeline with heavy equipment. Acceptable precautions include: backfilling the pipe trench as necessary to protect the pipe, concrete encasing the pipe, and placing steel plating over the pipe. Repair damage to the pipe caused by CONTRACTOR's operation.

R. Pipe Deflection: After completion of backfilling and before acceptance of the Work, test for excessive deflection on pipes larger than 30 inches in diameter by measuring the actual inside vertical diameter. Deflection measurements will be made by the ENGINEER. Pipe diametral deflection shall not exceed 2.0 percent of the nominal inside diameter measured in the vertical orientation and at any point in the pipe. Correct diametral deflection percent to less than 2.0 percent.

S. Cleaning: Remove stalling, soil, loose mortar, and any other debris from inside of the pipeline. Thorough sweep out and clean pipeline interior.

3.3 JOINTING

A. General:

1. Welded Joints: Perform interior and exterior joint welding prior to backfilling.
2. Final Lining Application at Joints:
 - a. Shop-Applied Cement Mortar Lining: After the backfill has been completed to final grade and a successful joint test and NDT has been performed, fill interior joint recess or LHA of cement-mortar-lined pipe with grout, tightly packed into the joint recess and troweled flush with the interior surface in accordance with AWWA C205. Remove excess grout. At no point shall there be an indentation or projection of the grout exceeding 1/16 inch.

B. Flanged Joints: Before the joint is assembled, the flange faces shall be thoroughly cleaned of all foreign material. The gasket shall be centered and the connecting flanges drawn up watertight without unnecessarily stressing the flanges. All bolts shall be tightened in a progressive diametrically opposite sequence and torqued with a suitable, approved and calibrated torque wrench. Torque values shall be as recommended by the pipe manufacturer. All clamping torque shall be applied to the nuts only.

C. Mechanical Couplings: When installing couplings, care shall be taken that the connecting pipe ends, couplings and gaskets are clean and free of all dirt and foreign matter. Install

in conformity with the recommendation and instruction of the coupling manufacturer and as specified for flanges.

- D. Wrenches used in bolting couplings shall be of a type and size recommended by the coupling manufacturer. Tighten coupling bolts so as to secure a uniform annular space between the follower rings and the body of the pipe with bolts tightened approximately the same amount. Tighten diametrically opposite bolts progressively and evenly. For final tightening, use a suitable, approved and calibrated torque wrench set for the torque recommended by the coupling manufacturer. Apply clamping torque to the nut only.
- E. Welded Joints:
 - 1. Perform welding under the supervision of UTILITIES CWI.
 - 2. Welds shall be sound and free from embedded scale or slag, and shall be watertight. Use butt welds for welded joints in pipe assemblies and in the fabrication of bends and other specials as indicated. Field-welded joints shall be either welded butt strap joints, welded butt joints, or welded lap joints as indicated and shall conform to AWS D1.1, AWWA C206, approved welding procedures, and referenced welding codes. In case of conflict, AWS D1.1 shall govern.
 - 3. Determine preheat and interpass temperature requirements for unlisted base metals according to AWS D1.1, *Annex XI guideline on Alternative Methods for Determining Preheat*.
 - 4. Repair, redo, and retest rejectable weld defects until sound weld metal has been deposited in accordance with appropriate welding codes.
 - 5. Where exterior welds are performed, provide adequate space for welding and inspection of the joints.
 - 6. When fitting up the ends of pipe to be welded or fitting butt-strap pieces, minor jacking or clamping will be allowed. Cold working the metal with sledges or localized application of heat will not be allowed. If field displacement of joints, where butt strap joints are indicated, does not allow proper fit up with the tolerances indicated, special closure butt straps or mitered pieces shall be shop fabricated and installed.
 - 7. Welded Lap Joints: During installation of welded steel pipe in either straight alignment or on curves, lay the pipe so that at any point around the circumference of the joint there is a minimum lap as shown on the Drawings. Hold back the toe of the weld from the nearest point of tangency of the bell radius as shown on the Drawings.
 - 8. Welded Butt Joints: Where used or required, shall be CJP and as indicated.
 - 9. Prior to beginning the welding procedure, remove tack welds or joint stops used to position the pipe during laying. Equally distribute annular space between the fraying surfaces of the bell and spigot around the circumference of the joint by shimming, jacking, or other suitable means. Perform welding in a manner that will maintain the equalized fitup. The weld shall then be made in accordance with ANSI/AWWA C206. Where more than one pass is required, remove dirt, slag, and flux before the succeeding bead is applied.
 - 10. After the pipe and pipe joint are properly positioned in the trench, weld and provide external joint protection for joints except the special temperature control lap joint hereinafter specified. Backfill to at least 1 foot above the top of pipe the lengths of pipe between special temperature control joints. Weld the special temperature control joints after the pipe is backfilled to at least 1 foot above the top of the pipe for the full distance to the temperature control joints upstream and downstream. Provide joint protection for special temperature control joints after completion of the joint welds and tests as specified. Exercise care during the initial backfilling to prevent movement of the pipe and to prevent any backfill material from being deposited on the special temperature control joint.
 - 11. Control of Temperature Stresses:

- a. Control temperature stresses in accordance with AWWA C206, the submitted and accepted temperature stress control submittal, and these Specifications.
 - b. Supply a special temperature control lap joint at intervals not exceeding 300 feet along welded reaches of the pipeline, at the first regular lap-welded field joints outside concrete encasements and structures, and where shown, unless otherwise approved by the ENGINEER. Lay joint with an initial lap of not less than 3 inches greater than the typical lap joint. Where temperature control lap joints occur in a traveled roadway or other inconvenient location, the location of the joint may be adjusted, as acceptable to the ENGINEER.
 - 1) Begin and complete the weld during the coolest interval of suitable length within the work day.
12. Welding Procedures:
- a. Upon completion of each field-welded joint, the welding operator shall mark his regular identification number and the last two digits of the year the Work was completed, or the CONTRACTOR may have a records system that traces a welder's work. Steel stamping directly on piping will not be acceptable unless "low stress" die stamps, such as interrupted dot or round-nose types, are used.
 - b. Test field welded joints in accordance with Article Field Quality Control. Allow UTILITIES' testing agency access to field welded joints to perform independent NDT.
 - c. Repair defective welds.
 - d. Following successful tests of the joint, coat the exterior joint spaces as indicated. Holiday test tape wrapped pipe, including heat shrink sleeves, as approved by the ENGINEER. After a successful Holiday test, backfilling may be completed.
 - e. UTILITIES' testing agency will perform other NDT testing.

3.4 REPAIR OF SHOP-APPLIED LININGS

- A. Shop-Applied Cement Mortar Lining: Repair damage to cement-mortar-lined pipe with grout, tightly packed into the opening recess and troweled flush with the interior surface in accordance with AWWA C205. Remove excess grout. At no point shall there be an indentation or projection of the grout exceeding 1/16 inch.

3.5 REPAIR OF SHOP-APPLIED COATINGS

- A. Coatings: In accordance with coating system provided for adjacent main line pipe.
 - 1. Section 09 90 05, Polyurethane Coating.

3.6 COATING OF FIELD-WELDED JOINTS

- A. In accordance with coating system provided for adjacent main line pipe.
 - 1. Section 09 90 05, Polyurethane Coating.

3.7 CATHODIC PROTECTION

- A. Apply to pipe as shown and as specified in Section 26 42 13, Passive Cathodic Protection for Underground and Submerged Piping.

3.8 FIELD QUALITY CONTROL

- A. Field Welding:

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1. UTILITIES' CWI will VT inspect all welds (100 percent inspection) and will mark to indicate acceptance or rejection. UTILITIES' CWI will perform the tests and inspections indicated in this section.
2. Test double welded butt-strap joints or double-welded lap joint welds by pressurizing to 40 psi in the area between the two fillet welds as indicated and in accordance with other requirements of AWWA C206.
 - a. Apply air or other ENGINEER-approved gas into connection between the two fillet welds.
 - b. Paint welds with soap solution.
 - c. Mark leaks indicated by escaping gas bubbles.
 - d. Close threaded openings with flush pipe plugs or by welding them.
 - e. This test is in addition to the test requirements specified for lap welds and butt-strap joints.
3. Inspect 100 percent of butt joint welds with full circumference RT or UT.
4. Inspect 100 percent of welded lap joint and welded butt-strap joint welds with full circumference PT or MT.
5. Weld Acceptance:
 - a. VT: Perform VT per AWS D1.1 paragraph 6.9 Visual
 - b. UT: Perform UT of CJP groove welds in accordance with AWS D1.1, paragraph 6.13.1
 - c. RT: Perform RT of CJP butt joint welds in accordance with AWS D1.1, paragraph 6.12.1.
 - d. PT or MT:
 - 1) Perform on fillet and PJP groove welds in accordance with AWS D1.1, paragraph 6.10.
 - 2) Acceptance shall be in accordance with VT standards specified above.
6. CONTRACTOR shall remove defective welds in manner that permits proper and complete repair by welding.
7. Caulking or peening of welds is not permitted.
8. CONTRACTOR shall pay for UTILITIES' CWI retesting of unsatisfactory welds at no additional cost to the UTILITIES.

B. Hydrostatic Testing:

1. General:
 - a. Notify ENGINEER in writing a minimum 5 days prior to testing. Perform testing in presence of ENGINEER.
 - b. Test all newly installed pressure pipelines. Use potable water as test medium. Pipeline shall successfully pass a leakage test prior to acceptance.
 - c. Unless otherwise provided herein, water for testing will be obtained by the CONTRACTOR.
 - d. Furnish testing equipment and perform tests in manner satisfactory to ENGINEER. Testing equipment shall provide observable and accurate measurements of leakage under specified conditions.
 - e. Provide sufficient temporary air tapings in the pipelines as needed to allow for evacuation of all entrapped air in each pipe segment to be tested. After completion of the test, such taps shall be permanently plugged.
 - f. Isolate new pipelines that are connected to existing pipelines. The test shall be made by closing valves when available or by placing suitably restrained temporary bulkheads in the pipe capable of resisting the thrust of the test pressure without damage to, or movement of, the adjacent pipe.
 - g. Conduct field hydrostatic test on buried piping after trench has been completely backfilled and all field-placed concrete or mortar has attained its specified 28-day strength.
 - h. Provide a UTILITIES-approved water quality laboratory testing service.
2. Procedure:

- a. Fill the pipeline with test water at a rate which will not cause any surges or exceed the rate at which the air can be released through air valves and temporary tappings at a reasonable velocity. Allow all air to be purged. Maximum filling velocity shall not exceed 0.50 feet per second, calculated based on the full area of pipe.
 - b. After the pipeline or test section has been filled, allow it to stand under a slight pressure for at least 24 hours to allow the concrete or mortar lining to absorb what water it will and to allow the escape of air from any air pockets.
 - c. Examine all exposed bulkheads, valves, and connections for leakage during this pre-test period.
 - d. Field Test HGL: 450 psi.
 - e. Maximum length of pipeline to be tested in a single hydrotest is: 7,000 feet.
 - f. Apply and maintain specified test pressure with hydraulic force pump. Valve off pump piping system when test pressure is reached.
 - g. Maintain hydrostatic test pressure continuously for 2 hours minimum, adding additional make-up water only as necessary to restore test pressure.
 - h. Determine actual leakage by measuring quantity of water necessary to maintain specified test pressure for duration of test.
3. Allowable Leakage:
- a. Pipe with welded joints shall have no allowable leakage.
 - b. Pipe with flange or exposed gasketed joints shall have no allowable leakage.
 - c. In the case of pipelines or pipeline sections that fail to pass the prescribed leakage test:
 - 1) Determine the cause of the leakage and take corrective measures necessary to repair the leaks.
 - 2) Retest the repaired section using the prescribed procedure.
 - 3) Continue repair and retest procedures until the tested section passes the test.
4. Discharge and Disposal of Hydrostatic Test Water:
- a. Locations for disposing and discharging of hydrostatic test water shall be in accordance with the following:
 - 1) At State-approved disposal locations and UTILITIES-approved disposal locations.
 - b. Prepare and provide a hydrostatic test water disposal plan a minimum of 45 days prior to discharge for UTILITIES and ENGINEER review.
 - c. Ensure that the pipelines are sufficiently vented to avoid negative pressures during discharge of hydrostatic test water.
 - d. Furnish and install additional UTILITIES-approved temporary erosion control facilities at discharge point, if necessary, prior to release and disposal of hydrostatic test water.
 - e. Provide and perform water quality testing and sampling of hydrostatic test water while the water is stored in the pipeline and during discharge.
 - f. For discharge to State-approved disposal locations, comply with State discharge permit requirements.
 - g. Control, monitor, and ensure that discharge does not exceed regulated water quality control thresholds for discharge. This work may include, but is not limited to, performing the following:
 - 1) Reduce concentrations in pH, total suspended solids, oil and grease, iron, and total residual chlorine (if source water is potable), and any other regulated water quality control parameters to not exceed thresholds for discharge.
 - 2) Furnish, install, and operate chemicals and chemical feed injection equipment as necessary to reduce hydrostatic test water concentrations to not exceed thresholds for discharge.
 - 3) Provide and operate pumps and meters for monitoring and recording discharge flow rates.

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- 4) For discharge to State-approved disposal locations, construct and use temporary holding ponds or use temporary storage tanks, as necessary, to facilitate reducing hydrostatic water concentrations to State thresholds for discharge. Remove temporary holding ponds after use to existing pre-construction grades and contours and restore site with seeding and mulching.
- 5) For discharge to State-approved disposal locations, prepare and submit State Discharge Monitoring Reports.

C. Revisions to Colorado Department of Transportation Standard Specifications

The definition of the Engineer in the Colorado Department of Transportation (CDOT) Standard Specifications is revised to mean the Engineer as defined in Section 100 of the City of Colorado Springs Engineering Division Standard Specifications.

References within the CDOT Standard Specifications that identify approval by CDOT are hereby revised to mean approval by the Engineer.

References within the CDOT Standard Specifications that identify requirements with CDOT Procedures are in effect to the extent the Engineer determines applicability to the City project.

References within the CDOT Standard Specifications that identify pre-approved products that are on the CDOT Approved Products List are recognized by the City as acceptable materials for this City project.

The following Revisions supplement or modify the Colorado Department of Transportation (CDOT) Standard Specifications for Road and Bridge Construction. Measurement and Payment for all bid items shall be in accordance with Section H, Measurement and Payment, and shall take precedence over the measurement and payment sections of the Standard Specifications or revisions thereof.

Revision of Section 206 – Excavation and Backfill for Structures

Revision of Sections 206 and 601 – Maturity Meter and Concrete Form and Falsework Removal

Revision of Section 208 – Erosion Control Supervisor

Revision of Section 250 – Environmental, Health, and Safety Management

Revision of Section 504 – Modular Block Wall

Revision to Section 514 – Pedestrian Handrail

Revision of Section 601 and 701 – Cements and Pozzolans
Revision of Sections 601 and 711 –
Liquid Membrane Forming Compounds For
Curing Concrete

Revision of Section 601 – Concrete Batching

Revision of Section 601 – Concrete Finishing

Revision of Section 601 – Concrete Slump Acceptance

Revision of Section 601 – QC Testing Requirements for Structural Concrete

Revision of Section 601 – Structural Concrete Strength Acceptance

Revision of Section 620 – Field Office

Revision of Section 625 – Construction Surveying

Revision of Sections 627 and 708 – Pavement Marking With Waterborne Paint and Low VOC
Solvent Base Paint

Revision of Section 631 – 36 x 11 Foot Concrete 3-Sided Culvert (Precast)

Revision of Section 703 – Concrete Aggregates

Revision of Section 708 - Paints

Revision of Section 712 – Water For Mixing or Curing Concrete

Revision of Section 712 -- Geotextiles

**REVISION OF SECTION 206
EXCAVATION AND BACKFILL FOR STRUCTURES**

Section 206 of the CDOT Standard Specifications for Road and Bridge Construction is hereby revised for this project as follows:

Subsection 206.02(a) shall include the following:

Structure Backfill (Special) shall meet the requirements of Table 703-3, Aggregate Base Course, Class 5 or Class 6, and shall be used in all locations where Class 1 or Class 2 Structure Backfill is specified.

Structure Backfill (Slope Repair) shall meet the requirements of Table 703-3, Aggregate Base Course, Class 1 or Class 4, and shall be used as directed by the Engineer to fill and repair the washed out slope below the east bridge slope paving at Abutment 5.

Subsection 206.03 shall include the following:

The washout area adjacent to east Abutment 5 shall be prepared as specified in the plans before repair fill is placed, including the removal of trash, organic material and other foreign material from the hole; the removal and processing of existing cantilevered grouted rubble slope paving from around the perimeter of the hole; and the breaking up of existing damaged sections or pieces of grouted rubble slope paving into 16" maximum pieces. The 16" maximum pieces of slope paving shall be incorporated into the work by thoroughly mixing with the structure backfill (slope repair) to remove all voids in the placed fill.

**REVISION OF SECTION 206 and 601
MATURITY METER AND CONCRETE FORM AND FALSEWORK REMOVAL**

Sections 206 and 601 of the Standard Specifications are hereby revised for this project as follows:

In subsection 206.03, delete the ninth paragraph and replace with the following:

Backfill material shall not be deposited against newly constructed masonry or concrete structures, until the concrete has developed a compressive strength of $0.8 f'_c$, except in cases where the structures support lateral earth pressure. Concrete compressive strength for structures supporting lateral earth pressure shall conform to subsection 601.12 (o). Concrete compressive strength shall be determined by maturity meters.

In subsection 601.09, delete (h) and replace with the following:

(h) *Removal of Forms.* The forms for any portion of the structure shall not be removed until the concrete is strong enough to withstand damage when the forms are removed.

Unless specified in the plans, forms shall remain in place for members that resist dead load bending until concrete has reached a compressive strength of at least 80 percent of the required 28 day strength, $0.80 f'_c$. Forms for columns shall remain in place until concrete has reached a compressive strength of at least 1,000 psi. Forms for sides of beams, walls or other members that do not resist dead load bending shall remain in place until concrete has reached a compressive strength of at least 500 psi.

Forms and supports for cast-in-place concrete box culverts (CBCs) shall not be removed until the concrete compressive strength exceeds $0.6 f'_c$ for CBCs with spans up to and including 12 feet, and $0.67 f'_c$ for CBCs with spans exceeding 12 feet but not larger than 20 feet. Forms for CBCs with spans larger than 20 feet shall not be removed until after all concrete has been placed in all spans and has attained a compressive strength of at least $0.80 f'_c$.

Concrete compressive strength shall be determined by maturity meters. At the pre-pour conference, the Contractor shall submit the location where maturity meters will be placed.

The Contractor shall provide maturity meters and all necessary wires and connectors. The Contractor shall be responsible for the placement and maintenance of the maturity meter and wire. . At a minimum a maturity meter will be placed at the mid-span of beams and at support locations. Placement shall be as directed by the Engineer.

For structures with multiple maturity meters, the lowest compressive strength shall determine when the forms can be removed.

Acceptance cylinders shall not be used for determining compressive strength to remove forms.

When field operations are controlled by maturity meters, the removal of forms, supports and housing, and the discontinuance of heating and curing may begin when the concrete is found to have the required compressive strength.

Forms for median barrier, railing or curbs, may be removed at the convenience of the Contractor after the concrete has hardened.

All forms shall be removed except permanent steel bridge deck forms and forms used to support hollow abutments or hollow piers when no permanent access is available into the cells. When permanent access is provided into box girders, all interior forms and loose material shall be removed, and the inside of box girders shall be cleaned.

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**REVISION OF SECTIONS 206 AND 601
MATURITY METER AND CONCRETE
FORM AND FALSEWORK REMOVAL**

In subsection 601.11, delete (e) and replace with the following:

- (e) *Falsework Removal.* Unless specified in the plans or specifications, falsework shall remain in place until concrete has attained a minimum compressive strength of 0.80f'c.

Falsework supporting any span of a simple span bridge shall not be released until after all concrete, excluding concrete above the bridge deck, has attained a compressive strength of at least 0.80f'c.

Falsework supporting any span of a continuous or rigid frame bridge shall not be released until after all concrete, excluding concrete above the bridge deck, has been placed in all spans and has attained the compressive strength of at least 0.80f'c.

Falsework for arch bridges shall be removed uniformly and gradually, beginning at the crown, to permit the arch to take its load slowly and evenly.

Falsework supporting overhangs and deck slabs between girders shall not be released until the deck concrete has attained a compressive strength of at least 0.80f'c.

Falsework for pier caps which will support steel or precast concrete girders shall not be released until the concrete has attained a compressive strength of at least 0.80f'c. Girders shall not be erected onto such pier caps until the concrete in the cap has attained the compressive strength of at least 0.80f'c.

Falsework for cast-in-place prestressed portions of structures shall not be released until after the pre-stressing steel has been tensioned.

Concrete compressive strength shall be determined by maturity meters. At the pre-pour conference, the Contractor shall submit the location that maturity meters will be placed.

The Contractor shall provide maturity meters and all necessary wires and connectors. The Contractor shall be responsible for the placement and maintenance of the maturity meters and wires. At a minimum a maturity meter will be placed at the mid-span of beams and at support locations. Placement shall be as directed by the Engineer.

For structures with multiple maturity meters, the lowest compressive strength shall determine when the falsework can be removed.

Acceptance cylinders shall not be used for determining compressive strength to remove falsework.

Subsection 601.12 (l) shall include the following after the first paragraph:

Concrete compressive strength shall be determined by maturity meters.

Subsection 601.12 shall include the following:

- (o) *Backfilling Structures that Support Lateral Earth Pressure.* Concrete compressive strengths shall reach f'c before backfilling operations can begin with heavy equipment, such as skid-steers or self-powered riding compactors. Concrete compressive strengths shall reach 0.8 f'c before backfilling operations can begin with hand operated equipment. Concrete compressive strength shall be determined by maturity meters.

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**REVISION OF SECTIONS 206 AND 601
MATURITY METER AND CONCRETE
FORM AND FALSEWORK REMOVAL**

Delete subsections 601.13 (2) and 601.13 (3) and replace with the following:

- (2) The minimum curing period shall be from the time the concrete has been placed until the concrete has met a compressive strength of 80 percent of the required field compressive strength. The Contractor shall develop a maturity relationship for the concrete mix design in accordance with CP 69. The Contractor shall provide the maturity meter and all necessary thermocouples, thermometers, wires and connectors. The Contractor shall place, protect and maintain the maturity meters and associated equipment. Locations where the maturity meters are placed shall be protected in the same manner as the rest of the structure.

Subsection 601.17 shall include the following:

- (f) *Maturity Meter Strength.* When maturity meters are specified for determining strength for removing forms, removing false work, backfilling against structures or loading the structure, the Contractor shall provide the Engineer a report of maturity relationships in accordance with CP 69 prior to placement of concrete.

If a maturity meter fails, is tampered with, is destroyed or was not placed, the following shall apply:

The minimum curing time or waiting time for removing forms, removing false work, backfilling against structures or loading the structure shall be 28 days.

The Contractor may choose at his own expense to core the structure represented by the maturity meter. Cores will be obtained and tested according to CP 65. Cores will be a minimum of 4 inches in diameter. A minimum of three cores in a two square foot area will be obtained. If the compressive strength of any one core differs from the average by more than 10 percent that compressive strength will be deleted and the average strength will be determined using the compressive strength of the remaining two cores. If the compressive strength of more than one core differs from the average by more than 10 percent the average strength will be determined using all three compressive strengths of the cores. The average compressive strength of the cores shall be achieve the specified compressive strength of the structure. A structure may only be cored once.

**REVISION OF SECTION 208
EROSION CONTROL SUPERVISOR**

Section 208 of the Standard Specifications is hereby revised for this project as follows:

In subsection 208.03(c), delete the first paragraph and replace with the following:

- (c) *Erosion Control Supervisor.* When included in the Contract, the Contractor shall assign to the project an individual to serve in the capacity of the Erosion Control Supervisor (ECS). The ECS shall be a person other than the Superintendent. The ECS shall be experienced in all aspects of construction and have satisfactorily completed the Transportation Erosion Control Supervisor (TECS) training program authorized by the Department. A copy of the TECS certificate shall be placed in the SWMP Notebook confirming certification number and that the qualification has not expired. Proof that this requirement has been met shall be submitted to the Engineer prior to or at the environmental preconstruction conference. The ECS shall act as the SWMP Administrator on the project. The SWMP Administrator shall be responsible for oversight of the implementation, maintenance, and revision of the SWMP for the duration of the project. The ECS shall use the information provided in CDOT's Erosion Control and Stormwater Quality Guide and the CDPS-SCP.

SECTION 250
ENVIRONMENTAL, HEALTH AND SAFETY MANAGEMENT

Section 250 of the Standard Specifications is hereby deleted for this project and replaced with the following:

DESCRIPTION

250.01 This work consists of protection of the environment, persons, and property from contaminants that may be encountered on the Project. This includes monitoring the work for encounters with contaminants or suspected soil and groundwater contaminants; the management of solid, special, and hazardous waste; and management of visual emissions associated with hazardous waste, when encountered on the project.

250.02 The Contractor shall furnish all personnel, materials, equipment, laboratory services and traffic control necessary to perform the contamination monitoring, testing, and site remediation when required. Traffic control shall be in accordance with the requirements of Section 630.

Monitoring equipment used to detect flammable gas, oxygen level, and toxic gas shall be capable of

Instrument Detection		
Constituent	Threshold Limit	Increments
Flammable Gas	1% LEL	1%
Oxygen	19%	0.1%
Toxic Gas	1 PPM	1 PPM
LEL = lower explosive limit PPM = parts per million		

detection to meet the following standards:

CONSTRUCTION REQUIREMENTS

250.03 General. Prospective bidders, including subcontractors, are required to review the environmental documents available for this project. These documents are listed in subsection 102.05 as revised for this project.

This project may be in the vicinity of property associated with petroleum products, heavy metal based paint, landfill, buried foundations, abandoned utility lines, industrial area or other sites which can yield hazardous substances or produce dangerous gases. These hazardous substances or gases can migrate within or into the construction area and could create hazardous conditions. The Contractor shall use appropriate methods to reduce and control known landfill, industrial gases, and visible emissions from asbestos encounters and hazardous substances which exist or migrate into the construction area. The Contractor shall follow CDOT's *Asbestos-Contaminated Soil Management Standard Operating Procedure, dated August 22, 2011* for proper handling of asbestos-contaminated soil, and follow all applicable Solid and Hazardous Waste Regulations for proper handling of soils encountered that contain any other substance mentioned above.

Encountering suspected contaminated material, including groundwater, old foundations, building materials, demolition debris, or utility lines that may contain asbestos or be contaminated by asbestos, is possible at some point during the construction of this project. When suspected contaminated material, including groundwater, is encountered or brought to the surface, the procedures under subsection 250.03(d) and 250.05 shall be followed.

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**SECTION 250
ENVIRONMENTAL, HEALTH AND SAFETY MANAGEMENT**

Transportation of waste materials on public highways, streets and roadways shall be done in accordance with Title 49, Code of Federal Regulations (CFR). All labeling, manifesting, transportation, etc. of waste materials generated on this project shall be coordinated with the Engineer. All hazardous waste manifests for waste materials generated on this project shall list the Colorado Department of Transportation as the generator of the waste materials except as otherwise noted. If the Contractor contaminates the site, the Contractor shall be listed as the generator on the hazardous waste manifests, permits, and other documents for such material. If the project is not on a State Highway or frontage road, then the appropriate local governmental entity having jurisdiction over the transportation system facility shall be listed as the hazardous waste generator.

If waste materials must be handled in a permitted treatment, storage and disposal (TSD) facility, the facility shall be designated in writing by the Engineer. If the waste materials are the result of the Contractor's actions, the Contractor shall designate the facility.

The hazardous waste transportation phase of the work involves insurance required by law and regulations. If the waste materials are determined to be hazardous, the Contractor must submit proof that the transportation company is covered by the appropriate type and amount of insurance required by laws and regulations governing the transportation of hazardous waste.

The Contractor alone bears the responsibility for determining that the work is accomplished in strict accordance with all applicable federal, state and local laws, regulations, standards, and codes governing special waste, petroleum and hazardous substance encounters and releases.

The Contract will list known or suspected areas of contamination. Health and Safety Officer, Monitoring Technician, and Health and Safety Plan shall be required when so stated in the Contract.

(a) *Health and Safety Officer (HSO)*. The Contractor shall designate a HSO, not the project superintendent, who shall have at least two years field experience in chemical related health and safety. The HSO shall be either a certified industrial hygienist (CIH), certified hazardous materials manager (CHMM), professional engineer (PE) licensed in the State of Colorado, certified safety professional (CSP), or registered environmental manager (REM) meeting the criteria set forth in 29 CFR 1926. When asbestos is present or is suspected to be present, the HSO shall have additional training and certification in accordance with the Air Quality Control Commission Regulation No. 8 Part B. The HSO shall meet the minimum training and medical surveillance requirements established by the Occupational Safety and Health Administration (OSHA) and the Environmental Protection Agency (EPA) for a supervisory Site Safety Official per 29 CFR 1962.65. The Contractor shall furnish documentation to the Engineer, at the preconstruction conference, that the above requirements have been met. 250.03.

The HSO shall *be* equipped with the following:

- (1) Communication equipment as required in subsection 250.03(d)2.A. and a vehicle.
- (2) Monitoring and detection equipment for flammable gas, oxygen sufficiency, toxic gas, radiological screening and other hazards. This includes, as required, a combustible gas indicator, flame ionization or photo ionization detector, oxygen meter, radiation monitor with Geiger Mueller detector and other foreseeable equipment.
- (3) Depth gauging equipment, sampling equipment and sampling containers.
- (4) Personal protective equipment (levels C and D) when required.

The HSO shall recommend and supervise those actions which will minimize the risk of hazardous substance related injury to the workers, Department personnel, the general public, property and the environment. Hazardous substance is defined in 29 CFR 1926.32. The HSO shall prepare written

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SECTION 250
ENVIRONMENTAL, HEALTH AND SAFETY MANAGEMENT

procedures for the monitoring of confined space entry and working in or near excavations, including but not limited to trenches and drill holes associated with this project. The HSO shall conduct or supervise all hazardous substance and solid waste related testing, sampling, monitoring and handling for this project to ensure compliance with applicable statutes and regulations, and other applicable environmental requirements under subsections 107.01 and 107.02.

The HSO shall be available for consultation and assistance with contaminated materials related testing, sampling, and field monitoring as required by the Engineer.

The HSO shall prepare and submit a bound and indexed final site report to the Engineer at the end of the project. This site report shall include a detailed summary of all contaminated materials and contaminated water that were encountered and their final disposition.

During each week the HSO is utilized, the HSO shall prepare a daily diary which shall be submitted to the Contractor and the Engineer. This diary shall be submitted at the end of the week and shall become a part of the Department's records. The diary shall contain a chronological log of activities on the project including: dates and times on site, equipment used and calibrations, field monitoring results, visual observations, conversations, directives both given and received, and disposition of suspected hazardous substances. The Engineer will review this submittal and approve the actual number of hours to be paid.

- (b) *Monitoring Technician (MT)*. The Contractor shall designate a monitoring technician to be responsible for monitoring of hazardous substances during work on the project. The MT shall have a minimum of two years of actual field experience in assessment and remediation of hazardous substances that may be encountered during highway construction projects. The MT shall be experienced in the operation of monitoring devices, identifying substances based upon experience and observation, and field sampling (for testing) of all media that may be found on the site. Completion of the 40 hour hazardous waste and 8 hour supervisory training required by OSHA and U.S. EPA rules and regulations which complies with the accreditation criteria under the provisions of the proposed 29 CFR 1910.121 is required prior to beginning work. The Contractor shall furnish documentation at the Preconstruction Conference that demonstrates these requirements have been met.

The MT shall be equipped with the following:

- (1) Communication equipment as required in subsection 250.03(d)2.A. and a vehicle.
- (2) Monitoring and detection equipment for flammable gas, oxygen sufficiency, toxic gas, radiological screening and other hazards. This includes, as required, a combustible gas indicator, flame ionization or photo ionization detector, oxygen meter, radiation monitor with Geiger Mueller detector and other foreseeable equipment.
- (3) Personal protective equipment (levels C and D) when required.

The MT shall be present on site and perform monitoring as required by 250.03(d) when work is being performed in areas of suspected contamination and on a predetermined basis throughout other work on the project.

The MT shall monitor for compliance with regulations, the project Health and Safety Plan and the Materials Management Plan (if they exist for the project), the Contract, and the environmental documents for the project. The MT shall immediately notify the Contractor, the Engineer and the HSO of any hazardous condition.

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SECTION 250
ENVIRONMENTAL, HEALTH AND SAFETY MANAGEMENT

During each week the MT is utilized, the MT shall prepare a daily monitoring diary which shall be submitted to the Contractor, HSO and the Engineer. This diary shall be submitted at the end of the week and shall become a part of the Department's records. The diary shall contain a chronological log of activities on the project including: dates and times on site, equipment used and calibrations, field monitoring results, visual observations, conversations, directives both given and received, and disposition of suspected hazardous substances. The Engineer will review this submittal and approve the actual number of hours to be paid.

- (c) *Health and Safety Plan (HASP)*. The HSO shall prepare a written HASP for the project, formatted as shown in Appendix B, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, DHHS (NIOSH) Publication Number 85-115, available from the Superintendent of Documents, U.S. Government Printing Office. The Contractor and the HSO shall review the environmental documents listed prior to preparation of the HASP.

Four signed copies of the HASP shall be furnished to the Engineer for acceptance. The Engineer shall have seven calendar days to review and accept or reject the proposed HASP. Within five calendar days after acceptance, the HSO shall distribute signed and stamped (or sealed) copies of the accepted HASP to each emergency response agency servicing the project area, the HASP designated emergency hospital, and five copies to the Engineer. Earth or demolition work shall not occur until after the HASP is accepted and the HASP has been distributed. The HASP shall also be available to the Contractor's employees, their representatives, and officials of OSHA, EPA, Colorado Department of Public Health and Environment (CDPHE), local government health department, Federal Highway Administration, and other appropriate agencies and officials as may be designated by the Engineer. The Engineer will distribute the accepted HASP to appropriate Department personnel. The HASP shall be kept current and shall be revised by the HSO as warranted by changes in the field conditions.

All on-site workers (Contractor's, Department's, Utilities', and others) shall be briefed by the HSO on the contents of the HASP and any revisions thereof. The HSO shall conduct briefings (group or individual) to inform new employees, subcontractors, utility companies and other on-site workers of the HASP contents prior to their entry on site. All personnel involved in excavation or other soil disturbing activities shall receive the required two-hour Asbestos Awareness training by a Certified Asbestos Inspector, when asbestos discoveries are anticipated, or discoveries are made. A signature log of all briefing attendees shall be kept and furnished to the Engineer. The Contractor shall provide, as required, eye wash equipment and stations, emergency showers, hand and face washing facilities and first aid equipment.

The Contractor shall provide, as required, decontamination facilities for personnel and equipment employed in the work. The exact procedure for decontamination and frequency shall be included in the accepted HASP. Decontamination facilities shall meet the criteria set forth in the Code of Federal Regulations (29 CFR and 40 CFR).

- (d) *Precautions and Procedures*. The following minimum precautions and procedures shall be followed during the construction of the project:

1. General construction precautions:

- A. All monitoring and piezometer wells and test borings shall be established or abandoned by the Contractor as regulated by the State Engineer's Office. Copies of all required permits, notification, and abandonment documents shall be submitted to the Engineer prior to payment approval.

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**SECTION 250
ENVIRONMENTAL, HEALTH AND SAFETY MANAGEMENT**

- B. Hazardous substance related activities shall have a work plan for each work phase which shall be coordinated with the Engineer at least three working days prior to commencement of each phase of the work.
 - C. The Contractor shall properly handle all investigation derived waste generated by this project. Documentation shall be submitted to the Engineer of all tests performed for Treatment, Storage and Disposal (TSD) determination; classification of waste; hauling records; TSD acceptance; manifest (if required); etc. in accordance with applicable laws and regulations.
 - D. When the work may involve air emissions, the Contractor shall contact the Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division to ascertain if an air pollution emission notice (APEN) or permit is required for this operation. The Contractor shall be responsible for filing the APEN and obtaining said permit, if required. The processing of air pollution permits, if required, in non-attainment areas or where public hearings are required, likely will take more than 90 days.
2. For construction on a known or potentially contaminated site, the following conditions shall apply, in addition to those listed in subsection 250.03(d)1:
- A. The HSO shall be on site or readily available by radio, telephone or pager at all times during the work. When on site, the HSO shall have an operational portable or mobile cellular telephone available for immediate use in areas where such service is available. When on site in cellular telephone non-service areas, the HSO shall have available, for immediate use, radio access to a site with telephone service. The HSO shall be notified at least 24 hours prior to the start of confined space entry, storage tank removal, drilling, excavation, trenching, or dewatering operations.
 - B. The HSO shall designate the onsite monitoring equipment for flammable gases, oxygen deficient or enriched atmosphere, and toxic gases, such as but not limited to, a flame ionization detector, photoionization detector, combustible gas indicator, and oxygen meter. This designated equipment shall be on site during all construction operations and be utilized during trenching, drilling, excavating, confined space entry, underground storage tank removal, and other appropriate construction operations. The exact equipment to fulfill this requirement shall be specified in the accepted HASP. The HSO shall conduct or supervise the monitoring. The monitoring equipment shall be calibrated as recommended by the manufacturer.
 - C. When drilling, trenching, or excavating in the presence of detectable concentrations of explosive gases, the soil shall be wetted and the operating equipment shall be provided with spark proof exhausts.
 - D. The Contractor, through the HSO, is responsible for ensuring that 29 CFR 1926 is fully complied with during the construction of the project.
 - E. Affected excavation operations shall be discontinued and personnel shall be removed from the affected excavation sites where any of the following levels are detected:
 - (1) 20.0 percent or more LEL flammable gas, or 10.0 percent in an underground or confined space,
 - (2) Permissible Exposure Limit (PEL) of any toxic gas,
 - (3) 19.5 percent or less oxygen,
 - (4) 25.0 percent or more oxygen,
 - (5) Greater than 2 mrem/hr. (Beta particle & photon radioactivity),

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- (6) Greater than 15 pCi/L (Gross alpha particle activity), or
 - (7) Other action levels as determined by the HSO.
 - (8) Uncovering of suspect Asbestos Containing Material (ACM), including but not limited to, buried facility components, active or abandoned utility lines, buried foundations and demolition debris, or miscellaneous ACM dispersed in the soil. The Contractor shall follow the procedures outlined in the HASP and 29 CFR 1926 to address these conditions. Work shall resume in these areas when approved by the Engineer.
- F. Personnel shall be issued and utilize appropriate Health and Safety equipment as determined by the HSO, who shall provide the Engineer with a written explanation of what personal protective equipment (PPE) shall be worn, when, and by which personnel. Except in emergency cases, the Engineer shall be advised by the HSO of changes in the degree of PPE prior to implementation.
 - G. Personnel shall avoid the area immediately downwind of any excavation unless the excavation is monitored and declared safe.
 - H. The operators of excavating, trenching, or drilling equipment shall wear appropriate PPE as required in the HASP.
 - I. Exhaust blowers shall be present at the location where required in the accepted HASP.
 - J. The Contractor shall accomplish the work with employees who have been trained and equipped as required by the HASP and applicable provisions of 29 CFR 1910 and 29 CFR 1926.
 - K. Fire extinguishers, electrical equipment and wiring shall conform to the applicable requirements of 29 CFR 1926 and 49 CFR.
 - L. Smoking shall not be permitted within 50 feet of any excavation.
- 3. For construction within 1000 feet of a known or potentially contaminated site, the following conditions, in addition to those listed in subsection 250.03(d) 1. shall apply:
 - A. The areas under construction shall be checked with a combustible gas indicator before excavation begins to determine if flammable or combustible gas is in the area.
 - B. Excavations, trenches and drill holes shall be monitored by the HSO for flammable gas, toxic gas and oxygen deficiency or enrichment. This shall be carried out continuously unless the presence of flammable, combustible or toxic gas, or oxygen deficiency or enrichment in the area can be ruled out by the HSO. The recommendation to discontinue monitoring must be agreed to by the Engineer and the Contractor. Prior to implementation, this agreement shall be written, and shall contain specific conditions that will require re-evaluation of the area.
 - C. When flammable or toxic gas is found in the area, those precautions and procedures in subsection 250.03(d)2 shall apply.
 - 4. The following procedures shall be followed if the level of contamination as documented in the environmental documents referenced in subsection 102.05 as revised for this project is exceeded, or if previously unidentified contaminated air, soil or water, is encountered during the construction of the project:
 - A. Work in the immediate area of the release or discovery of contamination shall cease. The Engineer shall be immediately notified.
 - B. If no HSO is required by the Contract, the Contractor shall designate an HSO as directed, in accordance with subsection 250.03(a).

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- C. The Engineer may direct the HSO to evaluate the material for potential hazardous substance or other contamination or unsafe conditions. This evaluation may include, but is not limited to, on site field monitoring, on site testing, and on or off site laboratory analysis. Removal of storage tanks and surrounding contaminated soils shall be in accordance with applicable laws, regulations and established procedures. If the contaminated material cannot be placed in the embankment or remediated on site, it must be removed to an appropriate TSD facility, as designated in writing by the Engineer. The HSO shall supervise the necessary testing required to make appropriate TSD determinations. Disposal of the unsuitable material shall be considered as remediation work as described in subsection 250.03(d)4.D and 250.03(d)4.E.
- D. If this site is determined to be contaminated with petroleum products, hazardous substances or other solid waste in excess of that indicated in the above listed site investigation documents, a thorough Site Investigation and Waste Management Plan shall be accomplished under the supervision of the HSO. The Site Investigation and Waste Management Plan shall be submitted to the Engineer for approval and shall determine the extent of contamination and propose at least three types of remedial action for the contaminated area as required by applicable statutes and regulations. The HSO shall be available to assist the Engineer in explaining this study to the regulatory agencies. When requested by the Engineer, the Contractor shall prepare a Remediation Plan based on the selected remedial method, and shall submit this to the Engineer for approval. The time required for the Engineer's review of the Remediation Plan, including all necessary drawings, calculations, specifications, and other documentation will not exceed four weeks after a complete submittal is received. This work shall not be done unless authorized in writing by the Engineer.
- E. If the site is determined to be contaminated with petroleum products; hazardous chemicals, materials, or wastes; or other solid wastes, and is required to be remediated, the HSO or other qualified individuals will supervise the Remediation Plan implementation as concurred to by the regulatory agencies, as directed. Hazardous Waste generated by remedial activities shall list the Colorado Department of Transportation as the hazardous waste generator on the required paperwork for projects on State Highways and their associated frontage roads. If this project is not on a State Highway or frontage road, then the appropriate local governmental entity having jurisdiction over the transportation system facility shall be listed as the hazardous waste generator. If the waste disturbed or produced was caused by Contractor negligence, the Contractor shall be listed as the hazardous waste generator. Remediation work shall be done only when authorized by the Engineer in writing.

250.04 Heavy Metal Based Paint Management. When the work includes the removal of paint or items covered with paint which may contain lead, chromium or other heavy metals, the requirements of this subsection shall apply in addition to the requirements of subsection 250.03.

The requirements of the HASP shall be in accordance with OSHA Publication Number 3142, *Working with Lead in the Construction Industry*.

Paint Removal and Waste Disposal work shall be performed in accordance with 29 CFR 1926.62, State and local air quality regulations, the Steel Structures Painting Council (SSPC) Guide for Containing Debris Generated During Paint Removal Operations, the *Industrial Lead Paint Removal Handbook* (SSPC 91-18), and the references contained therein.

The following minimum precautions and procedures shall be followed unless modified in the approved HASP or its updates:

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- (a) The Contractor shall contact the CDPHE, Air Pollution Control Division to ascertain if an air pollution permit is required for the cleaning or demolition work. If an air pollution permit is required, the Contractor shall obtain the permit. The Contractor shall furnish the Engineer with a copy of the permit application and the permit issued prior to starting cleaning or demolition activities. A copy of the Air Pollution Emission Notice [APEN] shall be provided to the Engineer, if such notice is required under the Colorado Air Quality Control Commission's regulations. The processing of air pollution permits in non-attainment areas, or where public hearings are required, likely will take more than 90 days.
- (b) The Contractor shall contain paint chips, corrosion residues, and spent abrasives, herein referred to as waste materials, resulting from the cleaning or demolition operations. The Contractor shall not deposit or release waste material into the water, air or onto the ground below or adjacent to the structure. The Contractor shall conduct cleaning operations to minimize the waste materials produced. Prior to beginning the work, the Contractor shall submit to the Engineer for acceptance, a detailed methods statement for capturing, testing, and disposing of the removed materials. The Engineer will have seven calendar days to review, and accept or reject this methods statement.
- (c) Abrasives utilized for blast cleaning shall be low-dusting and low waste. Unless approved otherwise, vacuum blasting or wheel blasting shall be used.
- (d) The HSO shall sample and test the waste material for lead, chromium, and other paint associated heavy metals using the Toxicity Characteristic Leaching Procedure (TCLP) Test, Method 1311 of the EPA publication, Test Methods for Evaluating Solid Waste 846. Sample collection methodology and frequency shall be recommended by the HSO and accepted by the Engineer with an adequate number of samples taken to be representative of all waste material collected. If the waste material does not pass the TCLP test, it shall be disposed of in a permitted TSD facility as designated in writing by the Engineer. The waste materials handling decision shall be documented by a report (five copies) submitted to the Engineer. This documentation shall include a description of sample collection methodology, testing performed, test results and comparison of test results with hazardous waste requirements. The waste material shall not be held at an unpermitted TSD facility site in excess of Resource Conservation and Recovery Act (RCRA) temporary storage time limits.
- (e) When an item coated with paint is removed, all loose paint shall be removed and collected from the item within 24 hours of the time it is removed or placed onto the ground. All loose paint shall be removed and collected from a painted item before it is removed from the site. The Contractor shall contain loose paint until it is removed and collected. Loose paint is defined as that which can be removed by manual scraping methods. Over waterways, the Contractor shall capture all paint debris by the method specified in the methods statement. The paint debris shall be collected on a daily basis and shall be stored in a properly labeled, tightly sealed container and placed in a secured location at the end of each working day.
- (f) All painted steel components which are not designated to be salvaged shall be recycled. Contractor possession of the steel for future use shall be considered a form of recycling. Prior to transport of the components off-site, the Contractor shall obtain a letter from the recipients of the painted steel components stating that they have been fully informed of the contents of the paint and are capable of handling the paint. If the Contractor is to maintain future possession of the steel, the Contractor shall supply this letter. If there will be more than one recipient of the painted material, one letter shall be obtained from each recipient. The Contractor shall provide a copy of each letter to the Engineer. If the painted steel components will be recycled by melting, the letter from the recipient is not required. The Contractor shall submit a letter stating the destination of the painted steel components and that they will be melted.

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(g) When the work consists of the removal of a bridge or components of a bridge coated with paint which has been assumed to contain lead, chromium, other heavy metals, or a combination thereof the Contractor shall capture paint debris which is dislodged during removal operations. The Contractor may choose any method for dismantling the bridge, subject to the following required construction sequence limitations:

- (1) The concrete deck shall be removed prior to removal of the steel superstructure.
- (2) If the methods statement indicates that girders will be dropped to the ground during dismantling, all debris from the concrete deck removal operation shall be removed from the area below the bridge before any girders are dropped into this area.
- (3) Girders may be cut and dropped only if the span is located entirely over land.

250.05 Material Handling. This work consists of the additional handling of groundwater and soils to be excavated for construction of the project which are suspected or known to be contaminated. This work also includes stockpiling or containerization, analytical sampling and testing, and final disposition of contaminated groundwater and soils requiring special handling.

The Contractor shall maintain vertical trench walls for the work in the specified areas of known or potential contamination, as shown on the plans. Shoring may be necessary to meet this requirement. The Contractor shall confine the removal of contaminated groundwater and soils encountered as a result of the excavation activities in the specified areas to the vertical and horizontal limits of structure excavation specified in the Contract. The Contractor shall be responsible for any contaminated materials generated beyond the limits of excavation. This shall include any sampling, analysis, and disposal required, and the costs thereof. The Contractor shall be listed as the generator of any such material. The limits of excavation shall be determined as 18 inches outside of structures, including sewers, water lines, inlets, manholes, and other underground structures to be constructed, or as directed.

Specific areas of known or potential contamination have been identified in the project plans. There is the potential of encountering contaminated groundwater and soil, which has not been summarized in the plans or specifications, at unknown locations on the site. Suspected contaminated soil and groundwater shall be handled by one of three methods as follows:

- (a) *Materials Handling (Stockpile & Containerization).* When recommended by the HSO and authorized by the Engineer, material shall be stockpiled or containerized for analysis and characterization for proper handling and, disposal, or both. Sampling and testing of materials shall be as described in the Contract. If analysis indicates that soil samples are designated as uncontaminated, as determined by the criteria shown in the Contract or as determined by the CDPHE, the associated soils will not require any special handling and will become the property of the Contractor and may be used on site, subject to other requirements of the Contract. Health and safety monitoring and strict fugitive dust control shall be conducted during the placement of these soils. If analysis indicates that groundwater samples are designated as uncontaminated, as determined by the criteria shown in the Contract or as determined by the CDPHE, the groundwater shall be handled in accordance with subsection 107.25.

Stockpiled and containerized materials shall be secured in compliance with the following provisions until they are determined to be uncontaminated:

1. The Contractor shall not store the material for more than 90 days.
2. The Contractor shall prevent any runoff from infiltrating the ground or running out of the containment area.
3. Soils and groundwater containing different contaminants shall be placed in separate containers or stockpiles.

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4. The Contractor shall prevent the dispersion of materials or the dilution or mixing of containers and stockpiles.
 5. The ground surface on which the contaminated soils will be placed shall be covered with plastic sheeting which will withstand the placement and removal of stockpiled materials without breaching.
 6. The ground surface shall be graded to drain toward the edge of the soil piles and the berm or trench around them shall be covered by plastic sheeting.
 7. Proper security shall be provided in accordance with 40 CFR.
- (b) *Solid Waste Disposal.* Soils determined to be contaminated, but not hazardous, as established by criteria in the Contract or as determined by CDPHE or other regulatory agencies having jurisdiction, shall be handled and disposed of, or both as recommended by the HSO and approved by the Engineer. The Contractor shall haul this material to a solid waste disposal facility.
- (c) *Contaminated Groundwater Disposal.* Groundwater determined to be contaminated, but not hazardous, as established by criteria in the Contract or as determined by CDPHE or other regulatory agencies having jurisdiction, shall be handled and disposed of, or both as recommended by the HSO and approved by the Engineer. The Contractor shall prepare a dewatering plan proposing at least three types of treatment and/or disposal options of contaminated groundwater as required by applicable statutes and regulations. One of the treatment options shall include permitting and onsite treatment prior to discharge or disposal. The dewatering plan shall be submitted to the Engineer for approval four weeks before dewatering activities begin.
- (d) *Hazardous Waste Disposal.* Soils and groundwater that are designated or suspected to be hazardous shall be containerized *immediately* upon excavation or upon discovery. Hazardous material shall be labeled and transported to a permitted treatment, storage and disposal (TSD) facility or to a hazardous waste disposal facility approved by the Engineer.
- (e) *Additional Requirements.* Stockpiled or containerized material characterized as uncontaminated, contaminated or hazardous shall be stored and disposed of in a manner consistent with current established federal, state, and local regulations for waste materials.

Materials with contaminants not specifically regulated shall be disposed of by the Contractor as directed, in consultation with CDPHE. All areas where wastes are generated shall be reviewed by the HSO to identify potential contaminant sources that may result in a contaminated waste stream.

Contaminated groundwater and soils, which have been identified as solid waste or hazardous waste, requiring disposal according to federal, state, and local regulations, shall be transported in accordance with 49 CFR by the Contractor to an appropriately permitted treatment facility, landfill, incinerator or asphalt plant or other facility approved to accept the waste. CDPHE and the landfill or other treatment or disposal facility shall be notified by the HSO of the material to be disposed of and the corresponding analytical test results prior to shipment. Potentially contaminated water collected from the lined trench of a stockpile shall be treated as required by Colorado Wastewater Discharge Permit System (CDPS) permits, 29 CFR and 40 CFR and reimbursed separately in accordance with Contract requirements.

250.06 Sample delivery. This work consists of the collection, containerization and delivery of material samples for analysis to the testing facility designated in the Contract.

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Environmental Protection Agency (EPA) protocol and standards shall be followed in the collection, containerization and transport of samples to be analyzed, including the documentation of the proper chain of custody of all samples. The Contractor shall collect sufficient sample material to perform the required analysis and is responsible for ensuring that appropriate climate control has been provided for sample transport. Sample delivery shall be made within the maximum allowable holding time for each sample type, not to exceed 24 hours, excluding weekends. The time period required for sample collection and delivery to the testing facility will not be considered an excusable delay. The analysis to be completed and turnaround time shall be approved by the Engineer.

The Contractor shall provide the Engineer with a copy of documentation indicating that proper chain of custody requirements have been followed for all samples.

Quality control samples shall be provided by the Contractor in accordance with the quality control requirements of the testing facility designated in the Contract (quality control requirements are available from the Engineer). The Contractor shall prepare, label and transport these samples to the testing facility in conjunction with the delivery of other samples authorized for analysis by the Engineer, at no additional cost.

The Engineer may request splits of samples, in advance of collection, which shall be provided at no additional cost by the Contractor.

250.07 Asbestos-Containing Material Management. Environmental documents or plans listed in the special provisions should include known or suspected locations that could involve encounters with ACM during excavation and other soil disturbing construction activities. Unexpected discoveries of ACM may be made during excavation and soil disturbing construction activities. Asbestos contaminated soil, shall be properly managed or remediated, in accordance with subsection 250.07(a).

All asbestos related activities shall be performed by Colorado certified asbestos professionals, contractors, or consultants. Certifications are issued by the Colorado Department of Public Health and Environment (CDPHE), Indoor Air Quality Unit. A Colorado Certified Asbestos professional shall manage the management and disposal of asbestos contaminated soil and other ACM. The Indoor Air Quality Unit within CDPHE is the only unit that certifies such professionals. The Contractor shall furnish a copy of the license to the Engineer.

- (a) *Regulatory Compliance.* Asbestos contaminated soil management is governed by 6 CCR 1007-2, Section 5, which includes and references regulatory compliance with Asbestos Hazard Emergency Response Act (AHERA) Colorado *Regulation* 8; Inspection and reporting protocol and demolition standards are governed by AHERA; Demolition and notification standards are governed by National Emission Standards for Hazardous Air Pollutants (NESHAPS); Colorado Regulation 8 governs all asbestos activities, demolition, permitting, and certification of Certified Asbestos Professionals in the State of Colorado. Colorado Regulation 8 is more stringent than AHERA and NESHAPS and supersedes federal regulations. Conflicting regulatory requirements between AHERA and NESHAPS, if not specifically addressed in Colorado Regulation 8, shall be addressed and approved protocol negotiated with CDPHE. The Contractor shall conform to all current regulations, policy directives, or both, issued by the EPA, CDPHE, and the Department.
- (b) *Asbestos Management and Visual Inspections* Asbestos management must be performed by a certified asbestos professional. Final Inspections of the area of asbestos contaminated soil removal shall be performed by an Asbestos Consultant to determine what, if any, controls must be instituted to allow future activity in the excavation area. All final visual inspections shall be conducted only when soil is dry.

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- (c) *Permitting and Notification.* The CDPHE requires notification of any soil disturbing activity where asbestos is known, suspected, or discovered. A 24-hour notification to CDPHE is required prior to any soil disturbing activity of an unplanned asbestos discovery. A 10 working day notification to CDPHE is required prior to any soil disturbing activity in an area with known or potential material suspected of containing asbestos in or on the soil or asbestos-contaminated soil. Removal of asbestos-containing material on a facility component, that is located on or in soil that will be disturbed, with asbestos quantities above the following trigger levels must be permitted and abated in accordance with the requirements of Air Quality Control Commission Regulation No. 8 (5 CCR 1001-10, Part B):

- (1) 260 linear feet on pipes,
- (2) 160 square feet on other surfaces, or
- (3) The volume of a 55-gallon drum.

All permit applications shall be submitted to the Colorado Department of Public Health and Environment a minimum of 10 days prior to start of work for approval. The permit application and notification shall be submitted simultaneously. The Contractor shall obtain all required State and local permits and shall be responsible for all associated fees. Permit application, notification, and waiver request forms shall be submitted to:

Colorado Department of Public Health and Environment Permit Coordinator/APCD - SS - B1
4300 Cherry Creek Drive South Denver, CO 80246-1530 Phone: (303) 692-3100 Fax: (303)
782-0278

Application and waiver forms are available on the CDPHE website: asbestos@state.co.us

- (d) *CDOT's Asbestos-Contaminated Soil Management Standard Operating Procedure, dated August 22, 2011.* Asbestos contaminated soil shall be managed in accordance with 6 CCR 1007-2, Section 5, Asbestos Waste Management Regulations. Regulations apply only upon discovery of asbestos materials during excavation and soil disturbing activities on construction projects, or when asbestos encounters are expected during construction. The contractor shall comply with procedures detailed in the CDPHE's Asbestos-Contaminated Soil Guidance Document and CDOT's approved *Asbestos-Contaminated Soil Management Standard Operating Procedure, dated August 22, 2011*, including the following minimum requirements:

- (1) Immediate actions and implementation of interim controls to prevent visible emissions, exposure, and asbestos contamination in surrounding areas.
- (2) Soil Characterization.
- (3) Training required for all personnel involved in excavation and other soil disturbing activities, once asbestos is encountered during construction or on projects where asbestos encounters are expected. Asbestos Awareness Training shall be given by a qualified and certified Asbestos Building Inspector with a minimum of six months experience inspecting asbestos contaminated soil.
- (4) Assessment for the presence and extent, within the proposed area of disturbance, of asbestos discoveries, whether expected or unexpected, by a Certified Asbestos Inspector.
- (5) Investigation and sampling required for risk assessment and management. Investigation, if required, shall be conducted by a Certified Asbestos Inspector.

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- (6) Risk assessment and determinations for further management or abatement.
 - (i) Risk assessment and determinations must be made by a Certified Asbestos Inspector, and coordinated with the Engineer.
 - (ii) Soil remediation is not necessarily required, depending on the circumstances.
 - (7) Submit 24-hour Notification of Unplanned Asbestos Discovery.
 - (8) Submit 10-day Notification of Planned Asbestos Management.
 - (9) Submit 24-hour Notification of Unplanned Asbestos Discovery.
 - (10) Submit 10-day Notification of Planned Asbestos Management.
- (e) *Risk Assessment and Determinations for Further Management Or Remediation.* Risk assessment and determinations for further management or remediation must be closely coordinated with the Project Engineer and Project Manager of the Statewide Management Plan.

250.08 Methamphetamine Lab Sites. Demolition of former Methamphetamine (meth) labs is enforced by the Governing Authority, which varies from county to county. The Contractor shall demolish all buildings that are identified as former meth labs, as listed in public listings by the Governing Authority. The Contractor shall provide evidence of demolition to the Governing Authority, obtain receipt of such evidence by the Governing Authority, and shall submit these to Engineer immediately following demolition.

Septic tank removal at known meth lab sites shall undergo preliminary assessment by an Industrial Hygienist or Certified Industrial Hygienist to determine proper removal and disposal. Work shall proceed in accordance with the recommendations of the Hygienist.

**REVISION OF SECTION 504
MODULAR BLOCK WALL**

Section 504 of the Standard Specifications is hereby revised for this project to include the following:

DESCRIPTION

504.06 This work consists of designing and constructing a modular block wall along the southern bank of South Douglas Creek just upstream of the structure as shown in the contract documents.

Work includes design, furnishing, and installing precast modular blocks (PMB) to the lines and grades shown on the plans and as specified herein. Also included is furnishing, and installing appurtenant materials required for construction of the complete system.

MATERIALS

1. Wall Units

- a. Dimension tolerances for precast modular blocks shall be +/- 3/16 inch for height, +/- 1/2 inch for length (along face), and +/- 1 inch for width (face to tail).
- b. Concrete for precast modular blocks shall have a minimum 28-day compressive strength of 4,000 psi. Entrained air content shall be between 5 and 7%.
- c. The color of the units shall be natural gray.

2. Wall Base

- a. The wall base shall consist of dense-graded crushed aggregate. A minimum of 75% of coarse material shall have 2 or more fractured faces. Wall base material shall meet the following gradation:

<u>US STANDARD SIEVE SIZE</u>	<u>PERCENT PASSING</u>
1-1/2"	80-100
3/4"	50-90
#4	0-40
#200	0-10

- b. The contractor may substitute concrete with a minimum 28-day compressive strength of 3,000 psi for the granular base material. Concrete may be placed full thickness or as a topping over a compacted granular the base. If used as a topping, the concrete shall have a minimum thickness of 3 inches.

3. Unit Fill

- a. Unit fill shall consist of a screened crushed aggregate. A minimum of 75% of coarse material shall have 2 or more fractured faces. Unit fill material shall meet the following gradation:

<u>US STANDARD SIEVE SIZE</u>	<u>PERCENT PASSING</u>
1-1/2"	100
3/4"	50-75
#4	0-40
#200	0-5

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**REVISION OF SECTION 504
MODULAR BLOCK WALL**

4. Backfill

- a. Backfill material shall consist of fill sand or other clean aggregate meeting the following gradation:

<u>US STANDARD SIEVE SIZE</u>	<u>PERCENT PASSING</u>
3/4"	100
#200	0-5

- b. All other backfill behind and in front of the wall shall consist of suitable on-site soil or imported borrow and shall be approved by the Engineer. Backfill shall generally consist of sands, silts, or lean clays with a liquid limit less than 45 and a plasticity index less than 20. Fat clay soils, cobbles, and large rock should generally be avoided unless approved by the Engineer based on local practices. Frozen soils, excessively wet or dry soils, debris, and deleterious materials should not be used.

5. Drain Tile

- a. Drain tile shall be a perforated or slotted PVC pipe. The drain tile should be daylighted at low points and/or periodically along the wall alignment as shown on the plans.

6. Geotextile Fabric

- a. Provide a geotextile filter for separation between the blocks and the backfill at the tails of the blocks. The geotextile shall be a needle punched, non-woven fabric with a minimum grab tensile strength of 120 pounds. The geotextile may cover the entire back face of the blocks or may be cut in strips to cover the gaps between tail units with a minimum of 6 inches of overlap over the concrete tail on both sides.

7. Submittals

- a. If a complete design is not depicted in the plans, submit for review 2 sets of shop drawings for the retaining wall system prepared by a Professional Engineer registered in the State of Colorado. The shop drawings shall indicate the layout, height, and construction details of the retaining wall system. Design shall conform to relevant requirements and design methodologies of AASHTO Standard Specifications for Highway Bridges. Upon request, design calculations shall also be submitted. Minimum safety factors for design shall be as follows:

	<u>GRAVITY WALL</u>
SLIDING	1.5
OVERTURNING	1.5
BEARING	2.0

- b. Submit grain size test results for aggregates to be used for the wall base and for unit fill.
- c. Submit test results on borrow material to be used for common backfill and for select backfill (if used) including Proctor and grain size or Atterberg limits results.

**REVISION OF SECTION 504
MODULAR BLOCK WALL**

8. Delivery, Storage, and Handling

- a. Contractor shall check the materials upon delivery to assure that proper materials have been received.
- b. Contractor shall protect the materials from damage. Damaged material shall not be incorporated into the wall.
- c. Contractor shall prevent excessive mud, concrete, adhesives and other substances that may adhere from coming in contact with the materials. Exposed faces of precast modular block units shall be reasonably free of chips, cracks, or stains when viewed from a distance of 10 feet

CONSTRUCTION REQUIREMENTS

1. Excavation

- A. Excavate as required for installation of the retaining wall system. Excavate to the base level for a sufficient distance behind the face to permit installation of the base.
- B. Slope or shore excavation as necessary for safety and for conformance with applicable OSHA requirements.

2. Wall Base

- A. Foundation soils shall be excavated to the dimensions shown on the plans. Foundation soil shall be observed by the Engineer to confirm that the bearing soils are similar to the design conditions or assumptions.
- B. Construct the wall base to the lines and grades shown on the plans. Place and consolidate concrete, strike, and finish plane and level. Overexcavated areas shall be filled with additional concrete or granular base material. Compact granular base material to provide a hard and level surface to support the wall units. Base material shall be compacted to a minimum of 95 percent of the maximum dry density (ASTM D698, Standard Proctor). Final base elevation shall be within 0.1 feet of plan elevation.
- C. Prepare and smooth the granular material to ensure complete contact of the first course with the base. The base may be dressed with fine aggregate to aid leveling.

3. Unit Installation

- A. Place the first course of units directly on the wall base. Check units for level and alignment. Units shall be within 1/8 inch of level from end to end and from front to back. Adjacent units should be in contact. If possible, begin placing units at the lowest section of the wall.
- B. Fill all voids between and within the blocks with granular unit fill. Additional unit fill is not required behind the units, but may be placed for the convenience of the contractor.
- C. Place backfill behind the units in maximum loose lifts of 8 inches and compact. Compact all backfill to a minimum of 95 percent of the maximum dry density (ASTM D698, Standard Proctor). For cohesive soils, the moisture content at the time of compaction should be adjusted to within -2 and +3 percent of optimum. Place backfill in successive lifts until level with the top of the facing unit.

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**REVISION OF SECTION 504
MODULAR BLOCK WALL**

- D. Remove all excess aggregate and other materials from the top of the units before laying up the next course.
- G. Place the next course of precast modular block units in running bond with the previous course. Place the web recess over the alignment hoop protruding from the unit below, and pull the unit forward to contact the hoop. Batter should be within ¼ inch tolerance (4 inches from 24 SF unit below, 2 inches from 6 SF unit below).
- I. Continue placing successive courses to the elevations shown on the plans. Construct wall in level stages, placing the units at each course for the entire length of the wall, if possible. Unit fill and backfill should be placed to the level of the top of the facing unit before placing the next course.
- J. Provide temporary swales to divert runoff away from wall excavation and away from face.
- K. Final grade above and below the retaining wall shall provide for positive drainage and prevent ponding. Protect completed wall from other construction. Do not operate large equipment or store materials above the wall that exceed the design surcharge loads.

4. Quality Control and Quality Assurance

4.01 Construction Quality Control

- A. The contractor is responsible to ensure that all installation and materials meet the quality specified in the construction drawings.
- B. The contractor shall verify that installation is in accordance with the specifications and construction drawings.

4.02 Quality Assurance

- A. The owner is responsible to engage testing and inspection services to provide independent quality construction assurance.
- B. Compaction testing shall be done a minimum of every 1 foot of vertical fill and every 100 lineal feet along the wall.
- C. Testing shall be done at a variety of locations to cover the entire backfill zone.
- D. The independent inspection professional should perform sufficient testing and observation to verify that wall installation substantially conforms to the design drawings and specifications.

**REVISION OF SECTION 514
PEDESTRIAN HANDRAIL**

Section 514 of the Standard Specifications shall be revised on this project as follows:

DESCRIPTION

Section 514.01 shall be revised to include the following:

This work consists of designing, fabricating, and installing pedestrian handrail on top of the concrete headwalls and wingwalls and adjacent to the concrete sidewalk for the trail beneath the structure as shown on the plans.

MATERIALS

Section 514.03 shall be revised to include the following:

- 6) High-strength grout, if used under post base plates, shall be a pre-packaged non-shrink grout manufactured for the intended purpose.

CONSTRUCTION REQUIREMENTS

Delete the first paragraph of Section 514.06

Section 514.06 shall be revised to include the following:

SUBMITTALS

At least thirty days prior to intended use, the Contractor shall provide the following submittals to the Engineer for review and approval.

- 1) Design Calculations: Submit design calculations for the railing and foundations, where applicable, prepared and sealed by a professional engineer registered in the State of Colorado. The calculations shall demonstrate the structural adequacy of the proposed railing construction as shown on the shop drawings, including all foundations, connections and post and rail sizes selected. The railing design calculations shall be in accordance with the applicable sections of the AASHTO Guide to Bicycle Facilities, 4th Edition, and the CDOT Bicycle and Pedestrian Facilities Guidelines. For purposes of design, the Contractor shall treat the railing as a bicycle railing with the loading as prescribed in the applicable section of the AASHTO specifications.
- 2) Shop Drawings: Shop Drawings shall be submitted in accordance with Section 108 and Schedule F. Submit layout drawings based upon the Contract plans and the requirements of this special provision. Shop drawings shall show post spacings and include all pertinent details for the railing and foundation construction such as member sizes, dimensions, methods of connection and assembly, details to accommodate expansion and contraction, bolts, welds, materials, painting, etc.

The Contractor shall not order materials until the Engineer's approval of the calculations and shop drawings has been obtained.

- 3) Statement of shop-applied finishes: Furnish to the Engineer a certified statement that the shop-applied finishes conform to these Specifications, including compliance with application thickness.

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**REVISION OF SECTION 514
PEDESTRIAN RAILING (STEEL) (SPECIAL)**

- 4) Sample panel: One sample panel shall be made available for review by the Engineer prior to mass fabrication of the entire quantity called for. The sample panel shall be complete, including paint.

DIMENSIONAL AND OTHER REQUIREMENTS

Pedestrian railing shall conform to the railing geometry and configuration as shown in the Contract plans, and to the additional requirements listed here.

- 1) The overall railing height, measured from the top of the concrete, shall be as shown in the Contract plans.
- 2) Railing post spacing along the length shall be uniform or nearly uniform. Nominal post spacing shall be 6.0 feet maximum.
- 3) The maximum clear opening between railing pickets, between posts, or between pickets and posts shall be 4 inches. The maximum clear opening between pickets and the top of the finished surface shall be 6 inches.
- 4) All structural tube members shall have seal-welded ends to prevent the intrusion of moisture.
- 5) Miscellaneous plates and bars shall have a minimum thickness of 1/4 inch. Where incorporated, post base plates shall have a minimum thickness of 3/8 inch.
- 6) The Contractor shall design and fabricate the railing to minimize the use of field welding. Designs using no field welding are preferred.
- 7) Railing shall be designed and detailed such that posts are perpendicular to the finished top horizontal surface of the concrete.

Each railing post connection to the top of the concrete shall be made with a minimum of 4 steel bolts. Connections using a steel-embedded plate with shear connectors or cast-in threaded inserts are permitted. Steel bolts/connectors shall be 3/8 inch diameter minimum. Bolts, if used, shall be cast-in to the top of the concrete or post-installed using epoxy adhesive. MECHANICAL EXPANSION-TYPE ANCHORS FOR THE POST-TO-CONCRETE CONNECTION ARE NOT PERMITTED.

- 8) Epoxy adhesive for anchor bolt installation into hardened concrete, if used, shall be from the CDOT Approved Products List for the intended purpose. The Contractor shall specify the epoxy adhesive he intends to use on the railing Shop Drawings.

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**REVISION OF SECTION 514
PEDESTRIAN RAILING (STEEL) (SPECIAL)**

INSTALLATION

- 1) The Contractor shall be responsible for timing the delivery of all items so as to minimize on-site storage time prior to installation. All stored materials and items shall be protected from weather, careless handling and vandalism.
- 2) Contractor shall handle, pack, and ship in such a manner as to minimize damage to the finish. Upon arrival at job site it is the Contractor's responsibility to take equal precautions. Since some surface damage is inevitable, Contractor shall store specified finish materials for touch-up on site and shall repair any damage immediately.
- 3) Railing shall be fabricated and fastened in accordance with the approved Shop Drawings. Railing posts shall be installed perpendicular to the finished top horizontal surface of the concrete, true to the lines and grades shown on plans.
- 4) Shim all bolted connections as necessary and secure bolts. Exposed bolts shall be fastened with nuts and lock washers and an approved semi-permanent adhesive to prevent bolts from loosening due to vibration or vandalism.

**REVISION OF SECTIONS 601 AND 701
CEMENTS AND POZZOLANS**

Sections 601 and 701 of the Standard Specifications are hereby revised for this project as follows:

In subsection 601.03, first paragraph, the following shall be added to the table:

High-Reactivity Pozzolans 701.04

Subsection 601.03 shall include the following:

Pozzolans shall consist of Fly Ash, Silica Fume and High-Reactivity Pozzolan.

In subsection 601.04, delete the third and fourth paragraphs and replace with the following

Cementitious material requirements are as follows:

Class 0 requirements for sulfate resistance shall be one of the following:

- (1) ASTM C 150 Type I, II or V
- (2) ASTM C 595 Type IL, IP, IP(MS), IP(HS) or IT
- (3) ASTM C 1157 Type GU, MS or HS
- (4) ASTM C 150 Type III cement if it is allowed, as in Class E concrete

Class 1 requirements for sulfate resistance shall be one of the following:

- (1) ASTM C 150 Type II or V; Class C fly ash shall not be substituted for cement.
- (2) ASTM C 595 Type IP(MS) or IP(HS).
- (3) ASTM C 1157 Type MS or HS; Class C fly ash shall not be substituted for cement.
- (4) When ASTM C 150 Type III cement is allowed, as in Class E concrete, it shall have no more than 8 percent C_3A . Class C fly ash shall not be substituted for cement.
- (5) ASTM C 595 Type IL; having less than 0.10 percent expansion at 6 months when tested according to ASTM C 1012. Class C fly ash shall not be substituted for cement.
- (6) ASTM C 595 Type IT; having less than 0.10 percent expansion at 6 months when tested according to ASTM C 1012.

Class 2 requirements for sulfate resistance shall be one of the following:

- (1) ASTM C 150 Type V with a minimum of a 20 percent substitution of Class F fly ash by weight
- (2) ASTM C 150 Type II or III with a minimum of a 20 percent substitution of Class F fly ash by weight. The Type II or III cement shall have no more than 0.040 percent expansion at 14 days when tested according ASTM C 452.
- (3) ASTM C 1157 Type HS; Class C fly ash shall not be substituted for cement.
- (4) ASTM C 150 Type II, III, or V plus High-Reactivity Pozzolan where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012

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**REVISION OF SECTIONS 601 AND 701
CEMENTS AND POZZOLANS**

- (5) ASTM C 1157 Type MS plus Class F fly ash or High-Reactivity Pozzolan where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012
- (6) A blend of portland cement meeting ASTM C 150 Type II or III with a minimum of 20 percent Class F fly ash by weight, where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012.
- (7) ASTM C 595 Type IP(HS).
- (8) ASTM C 595 Type IL plus Class F fly ash or High-Reactivity Pozzolan where the blend has less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012
- (9) ASTM C 595 Type IT; having less than 0.05 percent expansion at 6 months or 0.10 percent expansion at 12 months when tested according to ASTM C 1012.

Class 3 requirements for sulfate resistance shall be one of the following:

A blend of portland cement meeting ASTM C 150 Type II, III, or V with a minimum of a 20 percent substitution of Class F fly ash by weight, where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.

- (1) ASTM C 1157 Type HS having less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012. Class C fly ash shall not be substituted for cement.
- (2) ASTM C 1157 Type MS or HS plus Class F fly ash or High-Reactivity Pozzolan where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (3) ASTM C 150 Type II,III, or V plus High-Reactivity Pozzolan where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (4) ASTM C 595 Type 1L plus High-Reactivity Pozzolan where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (5) ASTM C 595 Type IP(HS) or IT having less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.
- (6) ASTM C 595 Type IL with a minimum of a 20 percent substitution of Class F fly ash by weight, where the blend has less than 0.10 percent expansion at 18 months when tested according to ASTM C 1012.

When fly ash or High-Reactivity Pozzolan is used to enhance sulfate resistance, it shall be used in a proportion greater than or equal to the proportion tested in accordance to ASTM C1012, shall be the same source and it shall have a calcium oxide content no more than 2.0 percent greater than the fly ash or High-Reactivity Pozzolan tested according to ASTM C 1012.

In subsection 601.05 delete the first paragraph and replace with the following:

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**REVISION OF SECTIONS 601 AND 701
CEMENTS AND POZZOLANS**

601.05 Proportioning. The Contractor shall submit a Concrete Mix Design for each class of concrete being placed on the project. Concrete shall not be placed on the project before the Concrete Mix Design Report has been reviewed and approved by the Engineer. The Concrete Mix Design will be reviewed and approved following the procedures of CP 62. The Concrete Mix Design will not be approved when the laboratory trial mix data are the results from tests performed more than two years in the past or aggregate data are the results from tests performed more than two years in the past. The concrete mix design shall show the weights and sources of all ingredients including cement, pozzolan, aggregates, water, additives and the water to cementitious material ratio (w/cm). When determining the w/cm, the weight of cementitious material (cm) shall be the sum of the weights of the cement, fly ash, silica fume and High-Reactivity Pozzolan.

In subsection 601.05, delete the 12th, 13th, 14th, 15th, and 16th paragraphs and replace with the following:

The Concrete Mix Design Report shall include Certified Test Reports showing that the cement, fly ash, High-Reactivity Pozzolan and silica fume meet the specification requirements and supporting this statement with actual test results. The certification for silica fume shall state the solids content if the silica fume admixture is furnished as slurry.

For all concrete mix designs with ASTM C150 cements, up to a maximum of 20 percent Class C, 30 percent Class F or 30 percent High-Reactivity Pozzolan by weight of total cementitious material may be substituted for cement.

For all concrete mix designs with ASTM C595 Type IL cements, up to a maximum of 20 percent Class C, 30 percent Class F or 30 percent High-Reactivity Pozzolan by weight of total cementitious material may be substituted for cement.

For all concrete mix designs with ASTM C595 Type IP, IP(MS), IP(HS) or IT cements; fly ash or High-Reactivity Pozzolan shall not be substituted for cement.

For all concrete mix designs with ASTM C1157 cements, the total pozzolan content including pozzolan in cement shall not exceed 30 percent by weight of the cementitious material content.

When the Contractor's use of fly ash or High-Reactivity Pozzolan results in delays to the project, when it is necessary to make changes in admixture quantities, the source, or the Contractor performs, the cost of such delays and corrective actions shall be borne by the Contractor.

The Contractor shall submit a new Concrete Mix Design Report meeting the above requirements when a change occurs in the source, type, or proportions of cement, fly ash, High-Reactivity Pozzolan, silica fume or aggregate. When a change occurs in the source of approved admixtures, the Contractor shall submit a letter stamped by the Concrete Mix Design Engineer approving the changes to the existing mix design. The change will need to be approved by the Engineer prior to use.

In subsection 601.06, second paragraph, delete (9) and replace with the following:

(9) Type, brand, and amount of cement, fly ash and High-Reactivity Pozzolan

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**REVISION OF SECTIONS 601 AND 701
CEMENTS AND POZZOLANS**

In subsection 601.06, delete (a) and replace with the following:

- (a) *Portland Cement, Fly Ash, High-Reactivity Pozzolan and Silica Fume.* These materials may be sacked or bulk. No fraction of a sack shall be used in a batch of concrete unless the material is weighed.

All bulk cement shall be weighed on an approved weighing device. The bulk cement weighing hopper shall be sealed and vented to preclude dusting during operation. The discharge chute shall be so arranged that cement will not lodge in it or leak from it.

Separate storage and handling equipment shall be provided for the fly ash, silica fume and High-Reactivity Pozzolan. The fly ash, silica fume, and High-Reactivity Pozzolan may be weighed in the cement hopper and discharged with the cement.

In subsection 701.01 delete and replace the second paragraph with the following:

All concrete, including precast, prestressed and pipe shall be constructed with one of the following hydraulic cements, unless permitted otherwise.

ASTM C 150 Type I

ASTM C 150 Type II

ASTM C 150 Type V

ASTM C 595 Type IL

ASTM C 595 Type IP

ASTM C 595 Type IP(MS)

ASTM C 595 Type IP(HS)

ASTM C 595 Type IT

ASTM C 1157 Type GU, consisting of no more than 15 percent limestone

ASTM C 1157 Type MS, consisting of no more than 15 percent limestone

ASTM C 1157 Type HS, consisting of no more than 15 percent limestone

In subsection 701.02 add the following after the first paragraph:

Blending of pozzolans according to ASTM D5370 is permitted to meet the requirements of ASTM C 618.

Add subsection 701.04 immediately following subsection 701.03 as follows:

701.04 High-Reactivity Pozzolans. High-Reactivity Pozzolans (HRP) shall conform to the requirements of AASHTO M321. HRPs are but not limited to metakaolin, rice hull ash, zirconium fume, ultra-fine fly ash, and fume from the production of 50 percent ferrosilicon (with SiO₂ less than 85 percent).

HRPs shall meet the following optional requirement of AASHTO M321: The sulfate expansion at 14 days shall not exceed 0.045 percent

HRP shall be from a preapproved source listed on the Department's Approved Products List. The HRP intended for use on the project shall have been tested and accepted prior to its use. Certified Test Reports showing that the HRP meets the specification requirements and supporting this statement with actual test results shall be submitted to the Engineer.

The HRP shall be subject to sampling and testing by the Department. Test results that do not meet the physical and chemical requirements may result in the suspension of the use of HRP until the corrections necessary have been taken to ensure that the material conforms to the specifications.

**REVISION OF SECTIONS 601 AND 711
LIQUID MEMBRANE-FORMING COMPOUNDS FOR CURING CONCRETE**

Sections 601 and 711 of the Standard Specifications are hereby revised for this project as follows:

In subsection 601.13 (b), first paragraph, delete the second sentence and replace with the following:

A volatile organic content (VOC) compliant curing compound conforming to ASTM C 309, Type 2 shall be used on surfaces where curing compound is allowed, except that Type 1 curing compound shall be used on exposed aggregate or colored concrete, or when directed by the Engineer.

Delete subsection 711.01 and replace with the following:

711.01 Curing Materials. Curing materials shall conform to the following requirements:

Burlap Cloth made from Jute or Kenaf		AASHTO M 182	
Liquid Membrane-Forming Compounds for Curing Concrete		ASTM C 309	
10	Sheet Materials for Curing Concrete	11	AASHTO M 171*
12	*Only the performance requirements of AASHTO M171 shall apply.		

Straw used for curing shall consist of threshed straw of oats, barley, wheat, or rye. Clean field or marsh hay may be substituted for straw when approved by the Engineer. Old dry straw or hay which breaks readily in the spreading process will not be accepted.

**REVISION OF SECTION 601
CONCRETE BATCHING**

Section 601 of the Standard Specifications is hereby revised for this project as follows:

In subsection 601.06, delete (13) and (17) and replace with the following:

- (13) Gallons of water added by truck operator, the time the water was added and the quantity of concrete in the truck each time water is added.
- (17) Water to cementitious material ratio.

**REVISION OF SECTION 601
CONCRETE FINISHING**

Section 601 of the Standard Specifications are hereby revised for this project as follows:

In subsection 601.12 (a) delete the fifth paragraph and replace it with the following:

Water shall not be added to the surface of the concrete to assist in finishing operations.

Hand finishing should be minimized wherever possible. The hand finishing methods shall be addressed in the Quality Control Plan for concrete finishing. Hand finished concrete shall be struck off and screeded with a portable screed that is at least 2 feet longer than the maximum width of the surface to be struck off. It shall be sufficiently rigid to retain its shape. Concrete shall be thoroughly consolidated by hand vibrators. Hand finishing shall not be allowed after concrete has been in-place for more than 30 minutes or when initial set has begun. Finishing tools made of aluminum shall not be used.

The Contractor shall provide a Quality Control Plan (QCP) to ensure that proper hand finishing is accomplished in accordance with current Industry standards. It shall identify the Contractor's method for ensuring that the provisions of the QCP are met. The QCP shall be submitted to the Engineer at the Preconstruction Conference. Concrete placement shall not begin until the Engineer has approved the QCP. The QCP shall identify and address issues affecting the quality finished concrete including but not limited to:

- (1) Timing of hand finishing operations
- (2) Methodology to place and transport concrete
- (3) Equipment and tools to be utilized
- (4) Qualifications and training of finishers and supervisors

When the Engineer determines that any element of the approved QCP is not being implemented or that hand finished concrete is unacceptable, work shall be suspended. The Contractor shall supply a written plan to address improperly placed material and how to remedy future hand finishing failures and bring the work into compliance with the QCP. The Engineer will review the plan for acceptability prior to authorizing the resumption of operations.

In subsection 601.14(a) delete the fourth paragraph.

**REVISION OF SECTION 601
CONCRETE SLUMP ACCEPTANCE**

Section 601 of the Standard Specifications is hereby revised for this project as follows:

Delete the fifth paragraph of Subsection 601.05 and replace with the following:

Except for Class BZ concrete, the slump of the delivered concrete shall be the slump of the approved concrete mix design plus or minus 2.0 inch. The laboratory trial mix must produce an average compressive strength at least 115 percent of the required field compressive strength specified in Table 601-1. When entrained air is specified in the Contract for Class BZ concrete, the trial mix shall be run with the required air content.

Delete Subsection 601.17 (b), 601.17 (d) and Table 601-3 and replace with the following:

- (b) *Slump.* Slump acceptance, but not rejection, may be visually determined by the Engineer. Any batch that exceeds the slump of the approved concrete mix design by 2.0 inches will be retested. If the slump is exceeded a second time, that load is rejected. If the slump is greater than 2 inches lower than the approved concrete mix design, the load can be adjusted with a water reducer, or by adding water (if the w/cm allows) and retested.

Portions of loads incorporated into structures prior to determining test results which indicate rejection as the correct course of action shall be subject to reduced payment or removal as determined by the Engineer.

- (d) *Pay Factors.* The pay factor for concrete which is allowed to remain in place at a reduced price shall be according to Table 601-3 and shall be applied to the unit price bid for Item 601, Structural Concrete.

If deviations occur in air content and strength within the same batch, the pay factor for the batch shall be the product of the individual pay factors.

**Table 601-3
PAY FACTORS**

Percent Total Air		Strength		
Deviations From Specified Air (Percent)	Pay Factor (Percent)	Below Specified Strength (psi) [< 4500 psi Concrete]	Pay Factor (Percent)	Below Specified Strength (psi) [≥ 4500 psi Concrete]
0.0-0.2	98	1-100	98	1-100
0.3-0.4	96	101-200	96	101-200
0.5-0.6	92	201-300	92	201-300
0.7-0.8	84	301-400	84	301-400
0.9-1.0	75	401-500	75	401-500
Over 1.0	Reject	Over 500	Reject	
			65	501-600
			54	601-700
			42	701-800
			29	801-900
			15	901-1000
			Reject	Over 1000

**REVISION OF SECTION 601
QC TESTING REQUIREMENTS FOR STRUCTURAL CONCRETE**

Section 601 of the Standard Specifications is hereby revised for this project as follows:

Delete the first paragraph of subsection 601.17 and subsection 601.17(a) and replace with the following:

601.17 Acceptance and Pay Factors. These provisions apply to all concrete. The Contractor shall sample 601 pay items for both QC and QA in accordance with CP 61. The Engineer will witness the sampling and take possession of the QA samples at a mutually agreed upon location. The Contractor shall be responsible for Quality Control (QC) testing for 601 pay items. QC testing shall be performed at least once per day and then once per 50 cubic yards for concrete slump, unit weight and concrete temperature for each 601 pay item.

- (a) *Air Content.* The first three batches at the beginning of each day's production for each 601 pay item shall be tested by the Contractor's QC and CDOT's QA for air content. When the QC and QA air content measurements differ by more than 0.5 percent, both the QC and QA air meters shall be checked in accordance with ASTM C 231. When air content is below the specified limit, it may be adjusted in accordance with subsection 601.08. Successive batches shall be tested by the Contractor's QC and witnessed by the Engineer until three consecutive batches are within specified limits. After the first three batches, CDOT will follow the random minimum testing schedule. After the first three batches the Contractor shall perform QC testing at a frequency of one random sample per 50 cubic yards. Air content shall not be adjusted after a CDOT QA test.

Subsection 601.19 shall include the following:

The Contractor's QC testing will not be measured and paid separately, but shall be included in the work.

**REVISION OF SECTION 601
STRUCTURAL CONCRETE STRENGTH ACCEPTANCE**

Section 601 of the Standard Specifications is hereby revised for this project as follows:

In subsection 601.17 (c), delete the first paragraph and replace with the following:

- (c) *Strength (When Specified)*. The concrete will be considered acceptable when the running average of three consecutive strength tests per mix design for an individual structure is equal to or greater than the specified strength and no single test falls below the specified strength by more than 500 psi. A test is defined as the average strength of three test cylinders cast in plastic molds from a single sample of concrete and cured under standard laboratory conditions prior to testing. If the compressive strength of any one test cylinder differs from the average by more than 10 percent that compressive strength will be deleted and the average strength will be determined using the compressive strength of the remaining two test cylinders.

**REVISION OF SECTION 620
FIELD OFFICE**

Section 620 of the CDOT Standard Specifications for Road and Bridge Construction is hereby revised for this project as follows:

Subsection 620.01 shall include the following:

The field office for this project shall be in general conformance with a Class 1 Field Office, as per the project specifications and CDOT M-Standard Plans, except as otherwise noted herein. The main uses for the field office shall be meeting place, storage for construction documents, and construction administration and inspection activities, such as preparing and reviewing paperwork, reports, etc. Storage of small equipment, material testing samples, etc., and other uses for the field office shall be as approved by the Engineer.

Subsection 620.02 shall be revised as follows:

Add the following paragraph: The Contractor may submit requests for variations from the requirements for a Class 1 Field Office to the Engineer for consideration. Variations from the requirements for a Class 1 Field Office shall be as directed and approved by the Engineer.

Subsection 620.03 shall include the following:

In Standard Plans M-620-1 and M-620-2, add:

Ignition Furnace: the ignition furnace shall comply with the requirements of CP-L 5120.

Subsection 620.06 shall be deleted and replaced with the following:

620.06 Construction Requirements. The Contractor shall furnish a suitable site for field facilities. The site shall be located within the right of way and is subject to the Engineer's approval. The temporary easements for the project shall not be used for the field office. The Contractor shall be responsible for restoring the area before the end of the project.

Facilities shall be on the project, leveled and ready for use prior to the start of any operations, other than construction traffic control.

The facilities shall be for the shared use of the Engineer (City) and Contractor, except that the field office shall contain one desk and chair specifically for use by the City of Colorado Springs and PPRTA staff.

The Contractor shall provide replacement equipment due to breakdown, damage, or theft within five working days.

Sanitary facilities shall be placed at least 50 feet from the nearest State Water, in locations accessible for servicing, and not in low lying areas subject to ponding. They shall be anchored to prevent movement or overturning.

**REVISION OF SECTION 625
CONSTRUCTION SURVEYING**

Section 625 of the CDOT Standard Specifications for Road and Bridge Construction is hereby revised for this project as follows:

Subsection 625.02 shall be revised as follows:

Delete the last paragraph (one sentence) and replace with the following: Traffic Control shall be in accordance with the requirements of Section 800 of the City of Colorado Springs Engineering Division Standards Specifications and Revision Of Section 800, Work Zone Traffic Control.

Subsection 625.04 shall be revised as follows:

The following sentence shall be added and become the first sentence of the second paragraph: Construction Surveying shall complete a check of the survey control provided in the plans and provide data to the Engineer that both confirms the check and identifies any issues or discrepancies between the check and the plans.

**REVISION OF SECTIONS 627 AND 708
PAVEMENT MARKING WITH WATERBORNE PAINT
AND LOW VOC SOLVENT BASE PAINT**

Sections 627 and 708 of the Standard Specifications are hereby revised for this project as follows:

In subsection 627.04, delete the first paragraph and replace with the following:

627.04 Pavement Marking with Waterborne, Low Volatile Organic Compound (VOC) Solvent Base, and High Build Acrylic Waterborne Paint (High Build). Striping shall be applied when the air and pavement temperatures are no less than 45 °F for waterborne and high-build paint, and no less than 40 °F for low VOC solvent base paint on asphalt or portland cement concrete pavements. The pavement surface shall be dry and clean. Surface cleaning shall be required when there is deicing material on the road. Weather conditions shall be conducive to satisfactory results.

In subsection 627.04 delete the table and replace it with the following

	Description	Paint		
		Waterborne	Low VOC	High Build
Alignment	Lateral Deviation	2.0 inch per 200 foot Max		
Coverage Rate	Sq. Ft. per Gallon	90-100	90-100	67-73
Thickness	Mil	16-18	16-18	22-24
Width	Inches	Per Plans +/- 0.25		
Dry Time	Minutes	5-10	5-10	5-10
Beads	Application Rate, lbs/gal	7-8		9-10

Subsection 627.13 shall include the following:

Pay Item	Pay Unit
Pavement Marking Paint (High Build)	Gallon

Delete subsection 708.05 and replace with the following:

708.05 Pavement Marking Materials. Except for pavement marking paint, pavement marking materials shall be selected from the Department's Approved Products List (APL). Prior to start of work, a Certified Test Report (CTR) for all pavement marking materials shall be submitted in accordance with subsection 106.13.

For white paint, the color after drying shall be a flat-white, free from tint, and shall provide the maximum amount of opacity and visibility under both daylight and artificial light. For yellow paint, the Federal Standard 595B shall be used to designate colors and the ASTM E308 shall be used to quantitatively define colors. After drying, the yellow paint shall visually match Federal Standard 595B color chip number 33538, and shall be within 6 percent of central color, PR-1 Chart, where $x = 0.5007$ and $y = 0.4555$ (The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 Standard Colorimetric System measured with Standard Illuminant D65.)

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**REVISION OF SECTIONS 627 AND 708
PAVEMENT MARKING WITH WATERBORNE PAINT
AND LOW VOC SOLVENT BASE PAINT**

- (a) *Low VOC Solvent Base Paint.* Low VOC Paint shall be ready mixed, and shall be capable of being applied to Asphalt or Portland Cement Concrete Pavements.
- (b) *Acrylic Waterborne Paint.* Acrylic waterborne paint shall be a lead-free, 100 percent Acrylic resin polymer waterborne *product*. The finished product shall maintain its consistency during application at temperatures compatible with conventional equipment.
- (c) *High Build Acrylic Waterborne Paint.* High build acrylic waterborne paint binder (nonvolatile portion of vehicle) shall be 100 percent HD 21 acrylic cross linking polymer, by weight, as determined by infrared analysis or other chemical analysis available to the Department.

Waterborne and High Build Acrylic Waterborne paint shall meet the following requirements:

Performance Requirements: The paint shall be water resistant and shall show no softening or blistering.

**Table 708-1
WATERBORNE AND HIGH BUILD ACRYLIC WATERBORNE PAINT**

Property	White	Yellow	Test Method
Nonvolatile portion of vehicle (white and yellow), %	43.0	43.0	ASTM D 2205
Pigment Composition			
Percent by weight♦	60.0	60.0	ASTM D 4451 ASTM D 3723
Paint			
Titanium Dioxide Content, lb/gal	1.0	0.2	ASTM D 5381
Properties of the Finished Paint			
Total Non-volatiles, (solids) % by weight	77.0	77.0	FTMS 141C - Method 4053.1, ASTM D 2369, or ASTM D 4758
Density, lbs/gal ■	14.0-14.6	14.0-14.6	ASTM D 2205
Consistency (Viscosity) White and Yellow, Krebs-Stormer Units	85-95	85-95	ASTM D 562
Freeze Thaw Stability	Shall complete 5 or more test cycles successfully		ASTM D 2243
Fineness of Grind, Cleanliness Rating B, minimum	3	3	ASTM D 1210
Scrub Resistance	800	800	ASTM D2486
Directional Reflectance: [5 mil Wet Film]	90	50	ASTM E 1347
Dry Opacity (Contrast Ratio): [5 mil Wet Film]	0.95	0.95	ASTM D 2805
♦Percent by weight shall include percent of organic yellow pigment.			
■Density shall not vary more than 0.3 lbs. /gal between batches.			

**REVISION OF SECTION 631
36 X 11 FOOT CONCRETE 3-SIDED CULVERT (PRECAST)**

Section 631 is hereby added to the Standard Specifications for this project as follows:

DESCRIPTION

- **631.01** This work consists of the design, rating, fabrication, delivery to the project site, and erection / construction of the Precast Concrete Bridge Units for North Chestnut Street over South Douglas Creek:

MATERIALS

631.02 Material shall conform to the following:

- Structure Backfill (Class 1) and Filter Material (Class B) shall conform to Section 206, Excavation and Backfill for Structures.
- Waterproofing Membrane shall conform to Section 515, Waterproofing (Membrane).
- Structural Concrete shall conform to Section 601.
- Reinforcing Steel shall conform to Section 602, Reinforcing Steel.

SUBMITTALS

631.03 The Contractor shall submit one electronic copy or six hard copy sets of the following along with the final submittal letter certifying that structural plans have been prepared in accordance with current design standards of the Colorado Department of Transportation :

- Design Calculations and Design Checks for the Precast Concrete Bridge Units. The design and design checks shall conform to the latest edition of COOT Bridge Design Manual.
- Rating Calculations. The rating calculations for the Precast Concrete Bridge Unit shall conform to the latest edition of the Bridge Rating Manual.
- Shop Fabrication Details (Shop Drawings) for Precast Concrete Bridge Unit.

This submittal shall be in accordance with Section 8.18 of Schedule F. The design calculations, plans and shop drawings shall contain the endorsement seal of the Professional Engineer, registered in the State of Colorado, responsible for the design.

Contractor's supplier of the Precast Concrete Bridge Unit shall provide a minimum of two (2) independently verified full scale load tests conforming to the design requirements listed herein.

Contractor's supplier of the Precast Concrete Bridge Unit shall provide evidence of a minimum of five (5) Precast Concrete Bridge Units of similar span and dimensions that have been installed in the last five years.

A schedule detailing the duration of fabrication, delivery of materials, and erection / placement shall be provided by the Contractor separately for 631 items and shall be incorporated into the overall project schedule.

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**REVISION OF SECTION 631
36 X 11 FOOT CONCRETE 3-SIDED CULVERT (PRECAST)**

CONSTRUCTION REQUIREMENTS

631.04 Design. The design of the Precast Concrete Bridge Units shall conform to all applicable requirements of *AASHTO LRFD Specifications for Highway Bridges*, Seventh Edition, 2014 (including the soil-structure interaction effects on buried structures), *CDOT Bridge Design Manual*, *CDOT Bridge Rating Manual* and the Project Geotechnical Report and Recommendations. The design of all elements shall address worst-case loading conditions anticipated for both the interim and ultimate configurations shown on the plans.

The minimum design load for the Precast Concrete Bridge Unit shall include the following:

1. Dead Load- Self weight, Structure Backfill, Roadway Pavement, Sidewalk, Concrete Headwalls, and Guardrail.
2. Earth Pressures
3. Live Load -HL-93

Basis of Precast Concrete Bridge Unit Design:

Basis of Unit Geometric Design.

- **Hydraulic Capacity**

Permitted impacts to floodplain hydraulics for the project were based on assumed dimensions of the precast concrete bridge units, as shown in the plans. This includes, but is not limited to, an inside opening width of 36'-0" and an inside opening height (rise above concrete pedestal) of 11'-0". The Contractor is responsible for preparing and submitting floodplain hydraulic analysis demonstrating the floodplain impacts of precast concrete bridge units not matching the assumed dimensions.

- **Trail Headroom Clearance**

Vertical clearance provided by the precast concrete bridge units over the Sinton Trail shall not be less than that shown on the plans, without written approval by the Owner.

631.05 Construction of Precast Elements. Fabrication, delivery to the project site and erection of the Precast Concrete Bridge Unit shall be in accordance with the specifications and at the locations and the lines and grade shown on the plans.

Precast element reinforcement details shall be as shown in the shop drawings provided by the manufacturer.

The forms used to manufacture the Precast Concrete Bridge Unit shall be sufficiently rigid and accurate to maintain the required precast element dimensions within the permissible tolerances provided below. All exposed casting surfaces shall have minimum CDOT Class 2 finish as defined in the latest edition of the Standard Specifications for Road and Bridge Construction.

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**REVISION OF SECTION 631
36 X 11 FOOT CONCRETE 3-SIDED CULVERT (PRECAST)**

Permissible Tolerances:

1. Interior dimension shall vary not more than 1% from the design dimensions nor more than 1 1/2", whichever is less.
2. The slab and wall thickness shall not be less than shown in the design by more than 1/4".
3. Variations in laying length of two opposite surfaces of the bridge units shall not be more than 1/2 " in any section.
4. The underrun in length of a section shall not be more than 1/2 " in any bridge unit.

**REVISION OF SECTION 703
CONCRETE AGGREGATES**

Section 703 of the Standard Specifications is hereby revised for this project as follows:

Delete the second paragraph of subsection 703.00 and Table 703-1.

Delete subsections 703.01 and 703.02 and replace with the following:

703.01 Fine Aggregate for Concrete. Fine aggregate for concrete shall conform to the requirements of AASHTO M 6, Class A. The minimum sand equivalent, as tested in accordance with Colorado Procedure 37 shall be 80 unless otherwise specified. The fineness modulus, as determined by AASHTO T 27, shall not be less than 2.50 or greater than 3.50 unless otherwise approved.

703.02 Coarse Aggregate for Concrete. Coarse aggregate for concrete shall conform to the requirements of AASHTO M 80, Class A aggregates, except that the percentage of wear shall not exceed 45 when tested in accordance with AASHTO T 96.

**REVISION OF SECTION 708
PAINTS**

Section 708 of the Standard Specifications is hereby revised for this project as follows:

In Subsection 708.02, add the following:

PAINTS		SPECIFICATION		
Pedestrian Railing		As described below		
Pedestrian Railing shall be shop-painted with a low VOC, polyester modified, aliphatic acrylic polyurethane paint (semi-gloss) specifically for in-shop applications over steel. Additionally, it shall be a fast drying, urethane that provides color and gloss retention for exterior exposure. It shall be able to be used directly over organic zinc rich primers (epoxy zinc primer and moisture cure urethane zinc primer).				
The paint color shall be “Bridge Green” with color proportions to be as follows and submitted to and approved by the Engineer.				
844 COLORANT	0Z	32	64	128
LB-LAMP BLACK	2	16	-	-
PG-PHTH GREEN	10	-	-	-
TW-WHITE	2	46	-	-
YO-YELLOW OX	-	50	-	-
PB-PHTH BLUE	-	50	-	-
4 Gallon Kit	Ultradeep			

Surface preparation and application shall be in accordance with the supplier's recommendations.

**REVISION OF SECTION 712
WATER FOR MIXING OR CURING CONCRETE**

Section 712 of the Standard Specifications is hereby revised for this project as follows:

In subsection 712.08, delete the third and fourth paragraphs and replace with the following:

Physical requirements for all geotextiles shall conform to the requirements of AASHTO M-288. Materials shall be selected from the New York Department of Transportation's Approved Products List of Geosynthetic materials that meet the National Transportation Product Evaluation Program (NTPEP) and AASHTO M-288 testing requirements. The current list of products that meet these requirements is located at:

www.dot.ny.gov

The Geotextile Approved Products List may be accessed by clicking on the following tabs once on the NYDOT site to:

- (1) A To Z Site Index
- (2) Approved List
- (3) Approved Products
- (4) Materials and Equipment
- (5) Geosynthetics for Highway Construction
- (6) Geotextiles

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**REVISION OF SECTION 712
WATER FOR MIXING OR CURING CONCRETE**

In subsection 712.08, delete Table 712-2 and replace with the following

**Table 712-2
TYPICAL VALUES OF PERMEABILITY COEFFICIENTS¹**

Turbulent Flow	Particle Size Range Millimeters (inches)		Effective Size	Permeability Coefficient k cm/s
	D max	D min	D 20 mm (inches)	
Derrick STONE	3000 (120)	900 (36)	1200 (48)	100
One-man STONE	300 (12)	100 (4)	150 (6)	30
Clean, fine to coarse GRAVEL	80 (3)	10 (1/4)	13 (1/2)	10
Fine, uniform GRAVEL	8 (3/8)	1.5 (1/16)	3 (1/8)	5
Very coarse, clean, uniform SAND	3 (1/8)	0.8 (1/32)	1.5 (1/16)	3
Laminar Flow				
Uniform, coarse SAND	2 (1/8)	0.5 (1/64)	0.6	0.4
Uniform, medium SAND	0.5	0.25	0.3	0.1
Clean, well-graded SAND & GRAVEL	10	0.05	0.1	0.01
Uniform, fine SAND	0.25	0.05	0.06	40 x 10 ⁻⁴
Well-graded, silty SAND & GRAVEL	5	0.01	0.02	4 x 10 ⁻⁴
Silty SAND	2	0.005	0.01	1.0 x 10 ⁻⁴
Uniform SILT	0.05	0.005	0.006	0.5 x 10 ⁻⁴
Sandy CLAY	1.0	0.001	0.002	0.05 x 10 ⁻⁴
Silty CLAY	0.05	0.001	0.0015	0.01 x 10 ⁻⁴
CLAY (30% to 50% clay sizes)	0.05	0.0005	0.0008	0.001 x 10 ⁻⁴
Colloidal CLAY (-2 µm 50%)	0.01	10	40	10 ⁻⁹
¹ Basic Soils Engineering, R.K. Hough, 2nd Edition, Ronald Pess Co.; 1969, Page 76. Note: Since the permeability coefficient of the soil will be unknown in most non-critical, non-severe applications for erosion control and drainage, the soil-permeability coefficients listed in Table 712-2 may be used as a guide for comparing the permeability coefficient of the fabric with that of the in-place soil				

**REVISION OF SECTION 712
GEOTEXTILES**

Section 712 of the Standard Specifications is hereby revised for this project as follows:
In subsection 712.08, delete the third and fourth paragraphs and replace with the following:

Physical requirements for all geotextiles shall conform to the requirements of AASHTO M-288. Materials shall be selected from the New York Department of Transportation's Approved Products List of Geosynthetic materials that meet the National Transportation Product Evaluation Program (NTPEP) and AASHTO M-288 testing requirements. The current list of products that meet these requirements is located at:

www.dot.ny.gov

The Geotextile Approved Products List may be accessed by clicking on the following tabs once on the NYDOT site to:

- (1) A To Z Site Index
- (2) Approved List
- (3) Approved Products
- (4) Materials and Equipment
- (5) Geosynthetics for Highway Construction
- (6) Geotextiles

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**REVISION OF SECTION 712
GEOTEXTILES**

In subsection 712.08, delete Table 712-2 and replace with the following

**Table 712-2
TYPICAL VALUES OF PERMEABILITY COEFFICIENTS¹**

Turbulent Flow	Particle Size Range Millimeters (inches)		Effective Size D 20 mm (inches)	Permeability Coefficient k cm/s
	D max	D min		
Derrick STONE	3000 (120)	900 (36)	1200 (48)	100
One-man STONE	300 (12)	100 (4)	150 (6)	30
Clean, fine to coarse GRAVEL	80 (3)	10 (1/4)	13 (1/2)	10
Fine, uniform GRAVEL	8 (3/8)	1.5 (1/16)	3 (3/8)	5
Very coarse, clean, uniform SAND	3 (1/8)	0.8 (1/32)	1.5 (1/16)	3
Laminar Flow				
Uniform, coarse SAND	2 (1/8)	0.5 (1/64)	0.6	0.4
Uniform, medium SAND	0.5	0.25	0.3	0.1
Clean, well-graded SAND & GRAVEL	10	0.05	0.1	0.01
Uniform, fine SAND	0.25	0.05	0.06	40 x 10 ⁻⁴
Well-graded, silty SAND & GRAVEL	5	0.01	0.02	4 x 10 ⁻⁴
Silty SAND	2	0.005	0.01	1.0 x 10 ⁻⁴
Uniform SILT	0.05	0.005	0.006	0.5 x 10 ⁻⁴
Sandy CLAY	1.0	0.001	0.002	0.05 x 10 ⁻⁴
Silty CLAY	0.05	0.001	0.0015	0.01 x 10 ⁻⁴
CLAY (30% to 50% clay sizes)	0.05	0.0005	0.0008	0.001 x 10 ⁻⁴
Colloidal CLAY (-2 µm 50%)	0.01	10	40	10 ⁻⁹
¹ Basic Soils Engineering, R.K. Hough, 2nd Edition, Ronald Pess Co.; 1969, Page 76. Note: Since the permeability coefficient of the soil will be unknown in most non-critical, non-severe applications for erosion control and drainage, the soil-permeability coefficients listed in Table 712-2 may be used as a guide for comparing the permeability coefficient of the fabric with that of the in-place soil				

SCHEDULE H

MEASUREMENT AND PAYMENT

RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Bid Form.

10.1 MEASUREMENT OF PAY QUANTITIES

- A. The Contractor shall make all measurements and determine all quantities and amount of work done under the Contract, subject to approval by the Engineer. At the time measurements are made for quantity determinations, the Engineer or his authorized assistant shall be present to verify such measurements. From quantity figures so ascertained, it will be the Contractor's responsibility to prepare a monthly periodical estimate of the work accomplished to date. This estimate shall be submitted to the Engineer each month for his review and check no later than the date established at the preconstruction conference. The form of such monthly estimates is to be subject to the approval of the Engineer.
- B. No measurement will be made for:
1. Work performed or materials placed outside of line indicated in the plans or established by the Engineer.
 2. Materials wasted, used, or disposed of in manner not called for under the contract.
 3. Rejected materials, (including materials rejected after it has been placed, if the rejection is due to the Contractor's failure to comply with the provisions of the contract).
 4. Hauling and disposal of rejected materials.
 5. Materials on hand after completion of the work.
 6. Any other work or material when payment is contrary to any provision of the contract.
 7. All incidental costs necessary for proper performance of the work.

10.2 ESTIMATED QUANTITIES

- A. The estimated quantities shown in the Bid Form are estimates only, being given only as the basis for comparison of the bids, and the City does not warrant, expressly or by implication, that the actual amount of work will correspond therewith. The right to increase or decrease the amount of any class or portion of the work, or to make changes in the work required as may be deemed necessary, is reserved by the City as provided elsewhere in these specifications. The basis of payment will be the actual unit bid items of work performed and measured in accordance with the contract. All prospective bidders should note that certain bid items may be included in the Bid Form to establish a unit price should the use of those items become necessary during construction. Allowance will not be made for loss of anticipated profits of additional compensation should the use of these items be deemed unnecessary.

10.3 PAYMENT FOR LUMP SUM ITEMS

- A. Measurement shall be for work actually completed.

10.4 PAYMENT FOR MATERIAL ON HAND

- A. Partial payments may be made on monthly estimates to the extent of 90 percent of the cost of materials not yet incorporated in the completed work, if the materials conform to the following requirements:
1. Meet the requirements of the Contract based upon inspections or testing by the Engineer, and
 2. Are delivered to or stockpiled in the vicinity of the project or other storage site(s) specifically approved by the Engineer, and
 3. Are properly stored, protected, and insured as to loss, damage, and title.
- B. Material delivered to an off-site storage facility will be considered for partial payment only if:
1. The storage site has been approved by the Engineer.

2. The off-site storage of materials is required for more than thirty calendar days.
 3. The material is tagged, labeled, or otherwise identified as belonging to the project.
 4. The cost of transportation to the site is provided for in advance.
- C. The cost of the material on hand will be determined by written evidence supplied by the Contractor in sufficient detail as will permit the Engineer to determine the Contractor's actual cost of the materials. The Contractor shall furnish the Engineer with an invoice prior to the progress payment.

10.5 DESCRIPTION AND PAYMENT

- A. Payment will be made only for those items listed in the Bid Form. All other items required for the work shall be considered incidental to the construction.

10.6 BID ITEM DESCRIPTIONS

Bid Item No. 1: Clearing

(LS)

a. Measurement

The quantity of Clearing to be paid for shall be one lump sum for the removal and disposal of straw erosion control material, removal and disposal of abandoned stockpiled pipes, grubbing, removing and disposing of vegetation and debris within the limits of the work accepted by the Engineer as complying with the plans and specifications.

Clearing shall be in accordance with Section 220 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 220 – Removal of Structures and Obstructions.

b. Payment

Payment shall be made at the applicable contract lump sum price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for removal of trees complying with the plans and specifications and shall be paid for under its own bid item.

Bid Item No. 2: Unclassified Excavation

(CY)

a. Measurement

The quantity of Unclassified Excavation to be paid for shall not be re-measured, but shall be the quantities designated in the Contract per cubic yard, removed and accepted by the Engineer as complying with the plans and specifications. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies on the plans in an amount of at least plus or minus ten (10) percent of the plan quantity.

Unclassified Excavation shall be in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 200 – Street Section.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Also included in this item is all embankment material (complete in place) and proper disposal of any excess materials.

Bid Item No. 3: Structure Excavation

(CY)

a. Measurement

The quantity of Structure Excavation to be paid for shall not be re-measured, but shall be the quantities designated in the Contract per cubic yard, completed and accepted by the Engineer as complying with the plans and specifications. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies on the plans in an amount of at least plus or minus ten (10) percent of the plan quantity.

When field changes are ordered or when there are errors on the plans, the measured quantities will be the volume computed to neat vertical lines positioned 18 inches outside of and parallel to the outline of the revised structure or footing, or to neat lines as shown on the plans. The excavation quantity will be the calculated volume of material removed within the prism of excavation as defined and limited above, or as shown on the plans, from which shall be deducted the volume occupied by the structure.

Structure Excavation shall be in accordance with Section 206 of the CDOT Standard Specifications for Road and Bridge Construction and with the Revision of Section 206 – Excavation and Backfill for Structures.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. This includes compaction and water, if needed.

Bid Item No. 4: Structure Backfill (Class 1)

(CY)

a. Measurement

The quantity of Structure Backfill (Class1) to be paid for shall not be re-measured, but shall be the quantities designated in the Contract per cubic yard, completed and accepted by the Engineer as complying with the plans and specifications. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies on the plans in an amount of at least plus or minus ten (10) percent of the plan quantity.

When field changes are ordered or when there are errors on the plans, the measured quantities will be the volume computed to neat vertical lines positioned 18 inches outside of and parallel to the outline of the revised structure or footing, or to neat lines as shown on the plans. The backfill quantity will be the calculated volume of material lying within the prism of excavation as defined and limited above, or as shown on the plans, from which shall be deducted the volume occupied by the structure.

Structure Backfill (Class 1) shall be in accordance with Section 206 of the CDOT Standard Specifications for Road and Bridge Construction and with the Revision of Section 206 – Excavation and Backfill for Structures.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. This includes compaction and water, if needed.

Bid Item No. 5: Structure Backfill (Class 2)

(CY)

a. Measurement

The quantity of Structure Backfill (Class 2) to be paid for shall not be re-measured, but shall be the quantities designated in the Contract per cubic yard, completed and accepted by the Engineer as complying with the plans and specifications. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies on the plans in an amount of at least plus or minus ten (10) percent of the plan quantity.

When field changes are ordered or when there are errors on the plans, the measured quantities will be the volume computed to neat vertical lines positioned 18 inches outside of and parallel to the outline of the revised structure or footing, or to neat lines as shown on the plans. The backfill quantity will be the calculated volume of material lying within the prism of excavation as defined and limited above, or as shown on the plans, from which shall be deducted the volume occupied by the structure.

Structure Backfill (Class 2) shall be in accordance with Section 206 of the CDOT Standard Specifications for Road and Bridge Construction and with the Revision of Section 206 – Excavation and Backfill for Structures.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. This includes compaction and water, if needed.

Bid Item No. 6: Removal of Asphalt Mat

(SY)

a. Measurement

The quantity of Removal of Asphalt Mat to be paid for shall be determined by measurement of the number of square yards of material actually removed, disposed of and accepted by the Engineer as complying with the plans and specifications.

Removal of Asphalt Mat shall be in accordance with Section 220 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 220 – Removal of Structures and Obstructions included in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for removal of asphalt mat shall include removal, full depth saw cutting of existing asphalt mat prior to removal, removal of asphalt mat, hauling, and off-site disposal of asphalt mat material. Areas of existing asphalt pavements shall be removed to full depth as required to the lines and grades indicated in the plans. Excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications, and will not be paid for separately, but shall be included in the related bid item necessary to complete the work.

Bid Item No. 7: Removal of Tree

(EA)

a. Measurement

The quantity of Removal of Tree shall be paid per each for the designated trees removed, disposed of and accepted by the Engineer as complying with the plans and specifications. Payment will be made for trees of trunk diameter over 3-Inch in diameter. Removal of all remaining trees and brushes shall be considered incidental shall be included in the cost of the item Clearing. The Contractor shall be responsible for visiting the site and determining the overall effort that is necessary to complete the work.

Removal of Tree shall be in accordance with Section 220 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 220 – Removal of Structures and Obstructions included in these specifications.

b. Payment

Payment shall be made for each removed tree and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for removal of trees shall include the cutting, removal, hauling, and off-site disposal of the designated trees.

Bid Item No. 8: Removal of Guardrail Type 3

(LF)

a. Measurement

The quantity of Removal of Guardrail Type 3 to be paid for shall be determined by measurement of the number of lineal feet of guardrail actually removed and accepted by the Engineer as complying with the plans and specifications.

Removal of Guardrail Type 3 shall be in accordance with Section 220 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 220 – Removal of Structures and Obstructions included in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Removal of Guardrail Type 3 shall include the removal and offsite disposal of all guardrail material as designated in the plans.

Bid Item No. 9: Removal of Curb and Gutter

(LF)

a. Measurement

The quantity of Removal of Curb and Gutter to be paid for shall be determined by measurement of the number of lineal feet of actually removed and accepted by the Engineer as complying with the plans and specifications.

Removal of Curb and Gutter shall be in accordance with Section 220.5 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 220.5 – Removal of Pavements, Sidewalks, Curbs, etc., included in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Removal of Curb and Gutter shall include the removal and offsite disposal of all Curb and Gutter material.

Bid Item No. 10: Removal of Fence (Chain Link)

(LF)

a. Measurement

The quantity of Removal of Fence (Chain Link) to be paid for shall be determined by measurement of the number of lineal feet of fence actually removed and accepted by the Engineer as complying with the plans and specifications.

Removal of Fence (Chain Link) shall be in accordance with Section 220 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 220 – Removal of Structures and Obstructions included in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Removal of Fence (Chain Link) shall include the removal and offsite disposal of all fencing material as designated in the plans.

Bid Item No. 11: Removal of Fence (Wood)

(LF)

a. Measurement

The quantity of Removal of Fence (Wood) to be paid for shall be determined by measurement of the number of lineal feet of fence actually removed and accepted by the Engineer as complying with the plans and specifications.

Removal of Fence (Wood) shall be in accordance with Section 220 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 220 – Removal of Structures and Obstructions included in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Removal of Fence (Wood) shall include the removal and offsite disposal of all fencing material as designated in the plans.

Bid Item No. 12: Remove and Reset Fence (Chain Link)

(LF)

a. Measurement

The quantity of Remove and Reset Fence (Chain Link) to be paid for shall be determined by measurement of the linear feet of chain link fence actually reset at a new location, completed and accepted by the Engineer as complying with the plans and specifications.

Remove and Reset Fence (Chain Link) shall be in accordance with Section 240 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 240 – Reset Structures.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for remove and reset fence (chain link) shall include the removal and off-site disposal of unusable material.

Bid Item No. 13: Remove and Reset Sign

(EA)

a. Measurement

The quantity of Remove and Reset Sign to be paid for shall be determined by measurement of the number of ground signs actually reset, including new posts, if necessary, with new foundations as required to restore the item to service at a new location, completed and accepted by the Engineer as complying with the plans and specifications.

Remove and Reset Sign shall be in accordance with Section 240 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 240 – Reset Structures.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for remove and reset sign shall include the removal and off-site disposal of unusable posts, original foundation material, etc.

Bid Item No. 14: Removal of Sidewalk

(SY)

a. Measurement

The quantity of Removal of Sidewalk to be paid for shall be determined by measurement of the number of square yards of material actually removed, disposed of and accepted by the Engineer as complying with the plans and specifications.

Removal of Sidewalk shall be in accordance with Section 220 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 220 – Removal of Structures and Obstructions included in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for removal of sidewalk shall include saw cutting, removal, hauling, and off-site disposal of existing sidewalk material. Any excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications, and will not be paid for separately, but shall be included in the related bid item

Bid Item No. 15: Removal of Pipe (96-Inch Corrugated Metal Pipe) (LF)

a. Measurement

The quantity of Removal of Pipe (96-Inch CMP) to be paid for shall be determined by measurement of the number of lineal feet of Pipe (96-Inch CMP) actually removed and accepted by the Engineer as complying with the plans and specifications.

Removal of Pipe (CMP) shall be in accordance with Section 220.4 of the City of Colorado Springs Engineering Division Standard Specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Removal of Pipe (96-Inch CMP) shall include the removal and offsite disposal of all Pipe (96-Inch CMP) material as designated in the plans.

Bid Item No. 16: Removal of Pipe (48-Inch Corrugated Plastic Pipe) (LF)

a. Measurement

The quantity of Removal of Pipe (48-Inch CPP) to be paid for shall be determined by measurement of the number of lineal feet of Pipe (48-Inch CPP) actually removed and accepted by the Engineer as complying with the plans and specifications.

Removal of Pipe (CPP) shall be in accordance with Section 220.4 of the City of Colorado Springs Engineering Division Standard Specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Removal of Pipe (48-Inch CPP) shall include the removal and salvage of all Pipe (48-Inch CPP) material as designated in the plans.

Bid Item No. 17: Removal of Pipe (36-Inch Corrugated Plastic Pipe) (LF)

a. Measurement

The quantity of Removal of Pipe (36-Inch CPP) to be paid for shall be determined by measurement of the number of lineal feet of Pipe (36-Inch CPP) actually removed and accepted by the Engineer as complying with the plans and specifications.

Removal of Pipe (CPP) shall be in accordance with Section 220.4 of the City of Colorado Springs Engineering Division Standard Specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Removal of Pipe (36-Inch CPP) shall include the removal and salvage of all Pipe (36-Inch CPP) material as designated in the plans.

Bid Item No. 18: Removal of Miscellaneous Utilities

(LS)

a. Measurement

The quantity of Removal of Miscellaneous Utilities will not be measured, but will be paid on a lump sum basis for all work for the actual Removal of Miscellaneous Utilities from the culvert excavation work area and accepted by the Engineer as complying with the plans and specifications.

Removal of Miscellaneous Utilities shall be in accordance with Section 220.5 of the City of Colorado Springs Engineering Division Standard Specifications and with the Colorado Springs Utilities Water Line and Waste Water Line Extension and Service Standards as amended and supplemented herein.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Payment for Removal of Miscellaneous Utilities shall include the removal and offsite disposal or salvage of all utility material as designated in the plans.

Bid Item No. 19: Removal of Waterline (12-Inch)

(LF)

a. Measurement

The quantity of Removal of Waterline (12-inch) to be paid for shall be determined by measurement of the number of lineal feet of waterline 12-inch actually removed and accepted by the Engineer as complying with the plans and specifications.

Removal of Waterline (12-inch) shall be in accordance with Section 220.4 of the City of Colorado Springs Engineering Division Standard Specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Payment for Removal of Waterline (12-inch) shall include the removal and offsite disposal or salvage of all waterline material as designated in the plans.

Bid Item No. 20: Removal of Waterline (24-Inch)

(LF)

a. Measurement

The quantity of Removal of Waterline (24-Inch) to be paid for shall be determined by measurement of the number of lineal feet of waterline 24-inch actually removed and accepted by the Engineer as complying with the plans and specifications.

Removal of Waterline (24-Inch) shall be in accordance with Section 220.4 of the City of Colorado Springs Engineering Division Standard Specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Payment for Removal of Waterline (24-inch) shall include the removal and offsite disposal or salvage of all waterline material as designated in the plans.

Bid Item No. 21: Removal of 8-Inch Sanitary Line

(LF)

a. Measurement

The quantity of Removal of 8-Inch Sanitary Line to be paid for shall be determined by measurement by linear foot of Removal of 8-Inch Sanitary Line actually removed and accepted by the Engineer as complying with the plans and specifications. As an alternative to removing the 8-inch sanitary line, the Contractor will have the option of filling sanitary pipes abandoned in place with Controlled Low Strength Material (CLSM) (Flow Fill) when allowed as shown in the plans. If the Contractor elects to use CLSM (Flow fill) to fill and abandon the existing pipe, the Contractor shall submit a method statement and mix design to the Engineer for approval. Either option shall be paid as Removal of 8-Inch Sanitary Line.

Removal of 8-Inch Sanitary Line shall be in accordance with Section 220.4 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 220.4 – Removal of Pipe.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Removal of 8-Inch Sanitary Line shall include the removal and offsite disposal or salvage of all Sanitary Line, or all labor, equipment, tools, and materials necessary to fill the pipe with CLSM (Flow Fill) material when allowed in the plans. Excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications, and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 22: Removal of Driveway

(SF)

a. Measurement

The quantity of Removal of Driveway to be paid for shall be determined by measurement of the number of square feet of material actually removed, disposed of and accepted by the Engineer as complying with the plans and specifications.

Removal of Driveway shall be in accordance with Section 220 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 220 – Removal of Structures and Obstructions included in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for removal of driveway shall include saw cutting, removal, hauling, and off-site disposal of existing driveway material. Any excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications, and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 23: Aggregate Base Course (Class 6)

(CY)

a. Measurement

The quantity of Aggregate Base Course (Class 6) to be paid for shall be determined by measurement of the number of cubic yards of aggregate base course material actually delivered, placed, and accepted by the Engineer as complying with the plans and specifications. Truck delivery tickets shall be submitted to the Engineer for quantity verification.

Aggregate Base Course (Class 6) shall be in accordance with Section 300 of the City of Colorado Springs Engineering Division Standard Specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. This includes compaction and water, if needed.

Bid Item No. 24: Asphalt Concrete Pavement (Grading S) (PG 64-28) (6-Inch)

(SY)

a. Measurement

The quantity of Asphalt Concrete Pavement (Grading S) (PG 64-28) (6-Inch) to be paid for shall be determined by measurement of the number of square yards of material actually furnished, constructed, and accepted by the Engineer as complying with the plans and specifications. Truck delivery tickets shall be submitted to the Engineer for quantity verification.

Asphalt Concrete Pavement (Grading S) (PG 64-28) (6-Inch) shall be in accordance with Section 400 of the City of Colorado Springs Engineering Division Standard Specifications and the Pikes Peak Region Asphalt Paving Specifications.

Tack coats of emulsified asphalt (slow setting) shall be applied as required for asphalt concrete pavement construction and shall be in accordance with Sections 400 and 410 of the City of Colorado Springs Engineering Division Standard Specifications and the Pikes Peak Region Asphalt Paving Specifications. However, tack coats of emulsified asphalt (slow setting) will not be measured for payment.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all materials; for preparation, mixing, delivery, placing and compaction of these materials; and for all labor, equipment, tools and incidentals necessary to complete the work. Payment shall also include all materials and work necessary to furnish and apply tack coats of emulsified asphalt (slow setting) as required for asphalt concrete pavement construction.

Bid Item No. 25: Concrete Sidewalk (4-Inch)

(SY)

a. Measurement

The quantity of Concrete Sidewalk (4-Inch) to be paid for shall be determined by measurement of the number of square yards of sidewalk actually constructed and accepted by the Engineer as complying with the plans and specifications.

Concrete Sidewalk (4-Inch) shall be in accordance with Section 500 of the City of Colorado Springs Engineering Division Standard Specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for concrete sidewalk shall include all materials such as concrete, prepping of subgrade, setting of forms, finishing and curing of concrete, joints, and all other items of work involved in construction of concrete sidewalk and bus pad that are not included in other bid items. Excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications, and will not be paid for separately, but shall be included in the related bid item. Compacted Aggregate Base Course (Class 6) shall be used as approved by the Engineer for base material below concrete sidewalks and shall be paid for under its own bid item.

Bid Item No. 26: Concrete Sidewalk (6-Inch)

(CY)

a. Measurement

The quantity of Concrete Sidewalk (6-Inch) to be paid for shall be determined by measurement of the number of cubic yards of sidewalk actually constructed and accepted by the Engineer as complying with the plans and specifications. The item shall include the sidewalk and toe walls to construct the trail as designated in the contract plans.

Concrete sidewalk work shall be in accordance with Section 02751 of the City of Colorado Springs Parks, Recreation, and Cultural Services Department Standard Specifications and the revisions to Section 02751 in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for concrete sidewalk shall include all materials such as concrete, welded wire fabric, reinforcing, prepping of subgrade, setting of forms, finishing and curing of concrete, joints, and all other items of work involved in construction of concrete sidewalk that are not included in other bid items. Excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications, and will not be paid for separately, but shall be included in the related bid item. Compacted Aggregate Base Course (Class 6) shall be used as approved by the Engineer for base material below concrete sidewalks and shall be paid for under its own bid item.

Bid Item No. 27: Concrete Pedestrian Ramp

(SF)

a. Measurement

The quantity of Concrete Pedestrian Ramp to be paid shall be determined by measurement of the number of square feet of concrete ramp actually constructed and accepted by the Engineer as complying with the plans and specifications.

Concrete Pedestrian Ramp shall be in accordance with Section 500 of the City of Colorado Springs Engineering Division Standard Specifications and with the City of Colorado Springs Standard Drawings. Concrete pedestrian ramps not meeting ADA requirements shall be removed and replaced to the correct specifications at the Contractor's expense.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Concrete Pedestrian Ramp shall include all materials such as concrete, prepping of subgrade, setting of forms, finishing and curing of concrete, joints, furnishing and installing detectable warning panels, and all other items of work involved in construction of concrete pedestrian ramps that are not included in other bid items. Excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications, and will not be paid for separately, but shall be included in the related bid item. Compacted Aggregate Base Course (Class 6) shall be used as approved by the Engineer for base material below concrete pedestrian ramps and shall be paid for under its own bid item.

Bid Item No. 28: Concrete Driveway

(SY)

a. Measurement

The quantity of Concrete Driveway to be paid for shall be determined by measurement of the number of square yards of driveway actually constructed and accepted by the Engineer as complying with the plans and specifications.

Concrete Driveway shall be in accordance with Section 500 of the City of Colorado Springs Engineering Division Standard Specifications and with the City of Colorado Springs Standard Drawings.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for concrete driveway shall include all materials such as concrete, prepping of subgrade, setting of forms, finishing and curing of concrete, joints, and all other items of work involved in construction of concrete driveways that are not included in other bid items. Excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications, and will not be paid for separately, but shall be included in the related bid item. Compacted Aggregate Base Course (Class 6) shall be used as approved by the Engineer for base material below concrete driveways and shall be paid for under its own bid item.

Bid Item No. 29: Curb and Gutter Type 2

(LF)

a. Measurement

The quantity of Curb and Gutter Type 2 to be paid for shall be determined by measurement of the number of linear feet of curb and gutter actually constructed and accepted by the Engineer as complying with the plans and specifications. Curb and gutter will be measured along the bottom of the face of the curb. Deduction in length will be made for drainage structures, such as catch basins, drop inlets, etc., installed in the curb and gutter.

Measurement will not be made for the variable concrete volume that is required for the bottom of the new variable thickness concrete pan/gutter to always extend a minimum of 6-Inch below the top of the adjacent existing concrete pavement, no matter the required height of the finished pan/gutter grade, so that a dowelled construction joint can be provided. Drilling and installation of dowel bars in adjacent existing concrete pavement in conformance with the plans and specifications will not be measured for payment

Curb and Gutter Type 2 shall be in accordance with Section 500 of the City of Colorado Springs Engineering Division Standard Specifications and with the City of Colorado Springs Standard Drawings.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Curb and gutter Type 2 shall include all materials such as concrete and dowel bars, forming and form removal, drilling and installation of dowel bars in adjacent existing concrete pavement, finishing and curing of concrete, contraction and expansion joints, grading, compaction, and all other items of work involved in construction of curb and gutter. Excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications, and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 30: Environmental Health and Safety Management

(FA)

a. Measurement

Environmental Health and Safety Management will not be measured, but will be paid for on a force account basis for the work performed and accepted by the Engineer as complying with the plans and specifications.

Environmental Health and Safety Management shall be in accordance with Section 250 of the CDOT Standard Specifications for Road and Bridge Construction Revision of Section 250 Environmental Health and Safety Management in these specifications.

b. Payment

Payment for Environmental Health and Safety Management shall be provided on a force account basis in accordance with subsection 109.04 of the CDOT Standard Specifications for Road and Bridge Construction and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Environmental Health, and safety management shall include all work performed by the Health and Safety Officer, Monitoring Technician, preparation of a HASP(s), submittals, and reporting. The work shall include sampling, delivery, testing, handling, containing, treatment, and proper off-site disposal of hazardous waste and contaminated ground water generated or found during the project. Payment shall include any other work related to environmental, health, and safety management and required to comply with all regulatory rules and laws. Copies of all documentation required to complete this work shall be submitted to the Engineer for the City's records.

Partial payment for Environmental Health and Safety Management, as determined by the Engineer, will be made as the work progresses. The Contractor shall submit a schedule of environmental related Health and Safety Management work before the first partial payment is made. The schedule shall indicate the itemized time estimated for specific tasks and the total time for the project. The Engineer will use the work schedule to help define the payment schedule. The Contractor shall submit a force account payment invoice for each partial payment. The force account invoice shall itemize each specific task for related to the Health and Safety Management work for force account payment in accordance with subsection 109.04 of the CDOT Standard Specifications for Road and Bridge Construction.

The Contractor shall be responsible for damage caused by construction operations to the environment, persons, or property. Expenditures associated with actions of the Contractor shall be borne by the Contractor at no cost to the project and the City of Colorado Springs.

Bid Item No. 31: Riprap (12-Inch) (CY)

a. Measurement

The quantity of Riprap (12 Inch) to be paid for shall be determined by measurement of the number of cubic yards of Riprap (12 Inch) actually constructed and accepted by the Engineer as complying with the plans and specifications.

Riprap (12 Inch) shall be in accordance with Section 624 of the City of Colorado Springs Engineering Division Standard Specifications.

b. Payment

Payments shall be made at the unit price set forth in the approved contract documents and shall be full compensation for all materials, tools, equipment and labor necessary to complete the work under this section in accordance with the approved contract documents and these specifications. Payment shall also include all filter and geotextile materials. Any excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 32: Riprap (24-Inch) (CY)

a. Measurement

The quantity of Riprap (24-Inch) to be paid for shall be determined by measurement of the number of cubic yards of Riprap (24 Inch) actually constructed and accepted by the Engineer as complying with the plans and specifications.

Riprap (24-Inch) shall be in accordance with Section 624 of the City of Colorado Springs Engineering Division Standard Specifications.

b. Payment

Payments shall be made at the unit price set forth in the approved contract documents and shall be full compensation for all materials, tools, equipment and labor necessary to complete the work under this section in accordance with the approved contract documents and these specifications. Payment shall also include all filter and geotextile materials. Any excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 33: Grouted Riprap (18-Inch) (CY)

a. Measurement

The quantity of Grouted Riprap (18-Inch) to be paid for shall be determined by measurement of the number of cubic yards of Grouted Riprap (18 Inch) actually constructed and accepted by the Engineer as complying with the plans and specifications.

Grouted Riprap (18-Inch) shall be in accordance with Section 624 of the City of Colorado Springs Engineering Division Standard Specifications.

b. Payment

Payments shall be made at the unit price set forth in the approved contract documents and shall be full compensation for all materials, tools, equipment and labor necessary to complete the work under this section in accordance with the approved contract documents and these specifications. Payment shall also include all filter and geotextile materials. Any excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 34: Grouted Boulder (24-Inch)

(SY)

a. Measurement

The quantity of Grouted Boulder (24-Inch) to be paid for shall be determined by measurement of the number of square yards of Grouted Boulder (24-Inch) actually constructed and accepted by the Engineer as complying with the plans and specifications.

Grouted Boulder (24-Inch) shall be in accordance with the Section 624 Rip Rap and Grouted Rip Rap Channel Construction and the Revision of Section 624 Grouted Rip Rap Channel included in these specifications.

b. Payment

Payments shall be made at the unit price set forth in the approved contract documents and shall be full compensation for all materials, tools, equipment and labor necessary to complete the work under this section in accordance with the approved contract documents and these specifications. Payment shall also include all filter and geotextile materials. Any excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 35: 24-Inch Grouted Boulder Edging

(LF)

a. Measurement

The quantity of 24-Inch Grouted Boulder Edging to be paid for shall be determined by measurement of the number of linear feet of 24-Inch Grouted Boulder actually constructed and accepted by the Engineer as complying with the plans and specifications.

24-Inch Grouted Boulder Edging shall be in accordance with the Section 624 Rip Rap and Grouted Rip Rap Channel Construction and the Revision of Section 624 Grouted Rip Rap Channel included in these specifications.

b. Payment

Payments shall be made at the unit price set forth in the approved contract documents and shall be full compensation for all materials, tools, equipment and labor necessary to complete the work under this section in accordance with the approved contract documents and these specifications. Payment shall also include all filter and geotextile materials. Any excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 36: Storm Water Treatment Device

(EA)

a. Measurement

The quantity of Storm Water Treatment Device to be paid for shall be determined by measurement of the number of Storm Water Treatment Devices actually completed and accepted by the Engineer as complying with the plans and specifications.

Storm Water Treatment Device shall be in accordance with Section 630 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 630 Storm Drains and Culverts in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to install a Storm Water Treatment Device (SWTD) and appurtenances as shown on the plans and specifications. Any structure excavation and backfill required to complete the work shall be performed in accordance with Section 206 of the CDOT Standard Specifications for Road and Bridge Construction, and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 37: Reinforced Concrete Pipe (12 Inch)

(LF)

a. Measurement

The quantity of Reinforced Concrete Pipe (12 Inch) to be paid for shall be determined by measurement of the number linear feet of Reinforced Concrete Pipe (12 Inch) actually completed and accepted by the Engineer as complying with the plans and specifications.

Reinforced Concrete Pipe (12 Inch) shall be in accordance with Section 630 of the City of Colorado Springs Engineering Division Standard Specifications and with the Revision of Section 630 Storm Drains and Culverts.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to install Reinforced Concrete Pipe (12 Inch) as shown on the plans and specifications. Any structure excavation and backfill required to complete the work shall be performed in accordance with Section 206 of the CDOT Standard Specifications for Road and Bridge Construction, and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 38: Pedestrian Handrail

(LF)

a. Measurement

The quantity of Pedestrian Handrail to be paid for shall be determined by measurement of the number of lineal feet of pipe railing actually fabricated, furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Pedestrian Handrail shall be in accordance with Section 514 of the CDOT Standard Specifications for Road and Bridge Construction and with the Revision of Section 514 – Pedestrian Handrail.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Pedestrian Handrail shall include the railing design and submittal of shop drawings to the Engineer and all anchorages, foundations, attachments, fabrication, priming and painting, and any other work and materials required for a complete Pedestrian Handrail system.

Bid Item No. 39: Modular Block Wall

(SF)

a. Measurement

The quantity of Modular Block Wall to be paid for shall be determined by measurement of the number of square feet of Modular Block Wall actually installed, and accepted by the Engineer as complying with the plans and specifications.

Modular Block Wall shall be in accordance with Section 500 Structures of the CDOT Standard Special Specification for Road and Bridge Construction and with Revision of Section 504 Modular Block Wall in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for Wall Design and Construction including all labor, equipment, tools, and materials necessary to complete the Modular Block Wall which shall include design, fabrication, transportation to the project site, and erection. Payment will also include any other item(s) necessary to complete the work such as Wall Base Material, Drain Tile, Wall Unit Fill Material, Geotextile Fabric, or as specified by the Wall supplier. Any excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 40: Concrete Class D (Bridge)

(CY)

a. Measurement

The quantity of Concrete Class D (Bridge) to be paid for shall not be re-measured, but shall be the quantities designated in the Contract per cubic yard, completed and accepted by the Engineer as complying with the plans and specifications. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies on the plans in an amount of at least plus or minus two (2) percent of the plan quantity.

Concrete quantities were determined by calculating the volume in accordance with the dimensions shown on the plans. Plan quantities reflect deductions for all voids designed into the structure, except deductions will not be made for the volume occupied by pipes or conduits less than 3 inches in diameter, reinforcing steel, anchors, weep holes, piling, form liners, and nominal chamfers.

Concrete Class D (Bridge) shall be in accordance with Section 601 of the CDOT Standard Specifications for Road and Bridge Construction and with the following Revisions of Section 601: Liquid Membrane Forming Compound For Curing Concrete, Concrete Batching, Concrete Finishing, Concrete Form and Falsework Removal, and Concrete Slump Acceptance.

Acceptance and pay factors described in Specifications subsection 601.17 shall apply.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item, subject to the pay factors described in Specifications subsection 601.17, and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Structure excavation required to complete the construction of concrete structures and related work shall be performed in accordance with Section 206 of the CDOT Standard Specifications for Road and Bridge Construction, and will be paid for under its own item.

Bid Item No. 41: Structural Concrete Coating

(SY)

a. Measurement

The quantity of Structural Concrete Coating to be paid for shall not be re-measured, but shall be the quantities designated in the Contract per square yard, completed and accepted by the Engineer as complying with the plans and specifications. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies on the plans in an amount of at least plus or minus two (2) percent of the plan quantity.

Quantities were determined by calculating the area in accordance with the dimensions and notes shown on the plans.

Structural Concrete Coating shall be in accordance with Section 601 of the CDOT Standard Specifications for Road and Bridge Construction.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item, and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Bid Item No. 42: Reinforcing Steel (Epoxy Coated)

(LB)

a. Measurement

The quantity of Reinforcing Steel (Epoxy Coated) to be paid for shall not be re-measured, but shall be the quantities designated in the Contract weight in pounds, completed and accepted by the Engineer as complying with the plans and specifications. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies on the plans in an amount of at least plus or minus two (2) percent of the plan quantity.

Prospective bidders shall verify the weight of reinforcing steel before submitting a proposal. Adjustment will not be made in the weight shown on the plans, other than for approved design changes or for an error as stipulated above, even though the actual weight may deviate from the plan weight.

The computed weight of epoxy coated reinforcing bars will be based on the nominal weight before application of the epoxy coating.

Reinforcing Steel (Epoxy Coated) shall be in accordance with Section 602 of the CDOT Standard Specifications for Road and Bridge Construction.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full

compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment shall also include supports, clips, wire and other material used for positioning and fastening reinforcement in place.

Bid Item No. 43: Reinforcing Steel

(LB)

a. Measurement

The quantity of Reinforcing Steel to be paid for shall not be re-measured, but shall be the quantities designated in the Contract weight in pounds, completed and accepted by the Engineer as complying with the plans and specifications. Exceptions will be made when field changes are ordered or when it is determined that there are discrepancies on the plans in an amount of at least plus or minus two (2) percent of the plan quantity.

Prospective bidders shall verify the weight of reinforcing steel before submitting a proposal. Adjustment will not be made in the weight shown on the plans, other than for approved design changes or for an error as stipulated above, even though the actual weight may deviate from the plan weight.

Reinforcing Steel shall be in accordance with Section 602 of the CDOT Standard Specifications for Road and Bridge Construction.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment shall also include supports, clips, wire and other material used for positioning and fastening reinforcement in place.

Bid Item No. 44: 36 x 11 Foot Concrete 3-Sided Culvert (Precast)

(LS)

a. Measurement

Compensation for the 36 x 11 Foot Concrete 3-Sided Culvert (Precast) to be paid as one lump sum for the design, fabrication, delivery to the project site, and erection / construction of the 36 x 11 Foot Concrete 3-Sided Culvert (Precast) completed and accepted by the Engineer as complying with the plans and specifications.

The 36 x 11 Foot Concrete 3-Sided Culvert (Precast) shall be completed in accordance with CDOT Standard Specifications for Road and Bridge Construction, and Revision of Section 631, 36 x 11 Foot Concrete 3-Sided Culvert (Precast) included in these specifications,

b. Payment

Payment shall be made at the applicable contract lump sum price for Bid Item and shall include full Payment for Bridge Design and Construction. Payment will be full compensation for all work, material, labor, equipment, and incidentals necessary to complete the item, which shall include design, design check, rating and construction of the Precast Concrete Bridge Unit, fabrication, transportation to the project site, and erection. Payment will also include any other item(s) necessary to complete the work such as Filter Material (Class B), and Waterproofing System including but not limited to the following: Primer, Sealwrap, Butyl Rope, Waterproofing (Membrane), or as specified by the Precast Concrete Bridge Unit supplier.

Bid Item No. 45: Drilled Caisson (42 Inch)

(LF)

a. Measurement

The quantity of Drilled Caisson (42 Inch) to be paid for shall be determined by measurement of the number linear feet measured from the elevation shown on the plans to the bottom of the hole as drilled. Drilled Caisson (42 Inch) shall be completed and accepted by the Engineer as complying with the plans and specifications.

Drilled Caisson (42 Inch) to be paid shall be in accordance with Section 503 of CDOT Standard Specifications for Road and Bridge Construction.

b. Payment

The unit price of drilled caissons shall be full compensation for making all excavations; hauling and disposal of excavated material; performing all necessary pumping; furnishing and placing required concrete and reinforcement steel, including the reinforcement projecting above the tops of the caissons necessary for splicing; all backfilling; removing casings; and for furnishing all tools, labor, equipment, and incidentals necessary to complete the work. No extra payment will be made for casing left in place. Section 503.09 (b) shall be deleted. Payment adjustments will not apply.

Bid Item No. 46: 1 ½" Inch Plastic Electrical Conduit

(LF)

a. Measurement

The quantity of 1 ½ -Inch Plastic Electrical Conduit to be paid for shall be determined by measurement of the number linear feet of conduit and pull boxes actually placed and accepted by the Engineer as complying with the plans and specifications.

1 ½ -Inch Plastic Electrical Conduit shall be in accordance with Section 613 and Section 715 of CDOT Standard Specifications for Road and Bridge Construction.

b. Payment

The unit price 1 ½ -Inch Plastic Electrical Conduit shall be full compensation for conduits, junction boxes, splice boxes, pull boxes, and expansion joints for conduits, material, tools, labor, equipment, and incidentals necessary to complete the work. No extra payment will be made for saw cutting; trenching; excavation; backfill; jacking; drilling pits; underground electrical warning tape; removal of pavement; and all other work necessary to complete conduit installation.

Bid Item No. 47: Guardrail Type 3

(LF)

a. Measurement

Guardrail Type 3 will be measured by the linear foot along the centerline of the rail from end to end as shown on the plans, excluding end anchorages, median terminals, and transitions, completed and accepted by the Engineer as complying with the plans and specifications.

Guardrail Type 3 shall be in accordance with Section 606 of CDOT Standard Specifications for Road and Bridge Construction, Guardrail.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to install Guardrail Type 3 as shown on the plans and specifications. All work and materials necessary and incidental to the temporary treatment of guardrail ends will not be measured and paid for separately but shall be included in the work. Posts will be included in the quantities of guardrail of the specified type and not measured separately. Additional posts required for guardrail adjacent to bridges and obstructions, as shown on the plans, will not be measured and paid for separately but shall be included in the work. Partial payments will not be made for partially completed guardrail runs that do not conform to the end treatments specified in subsections 606.03(c) or 606.04.

Bid Item No. 48: End Anchorage Type 3D**(EA)**

a. Measurement

End Anchorage Type 3D will be measured by the actual number placed and accepted. Each end anchorage shall include all W-beam rails, post, blocks, concrete, reinforcing steel, anchor bolts, cable, rods, turnbuckles, end treatments, backing rail, plates, hardware and all other work and material necessary to complete the End Anchorage Type 3D and accepted by the Engineer as complying with the plans and specifications.

End Anchorage Type 3 shall be in accordance with Section 606 of CDOT Standard Specifications for Road and Bridge Construction, Guardrail.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to install End Anchorage Type 3D as shown on the plans and specifications. All work and materials necessary and incidental to the temporary treatment of guardrail ends will not be measured and paid for separately but shall be included in the work. Partial payments will not be made for partially completed guardrail runs that do not conform to the end treatments specified in subsections 606.03(c) or 606.04.

Bid Item No. 49: 72-Inch Chain-Link Fence (Complete in Place)**(LF)**

a. Measurement

72-Inch Chain-Link Fence (Complete in Place) will be measured by the linear foot. Measurement will be along the base of the fence from outside to outside of end posts for each continuous run of fence completed and accepted by the Engineer as complying with the plans and specifications. End posts, corner posts and line brace posts will not be measured and paid for separately but shall be included in the work. Line posts required for new fence will not be measured separately, but shall be included in the contract unit price for new fence.

72-Inch Chain-Link Fence (Complete in Place) shall be in accordance with Section 607 of CDOT Standard Specifications for Road and Bridge Construction, Fences.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to install 72-Inch Chain-Link Fence (Complete in Place) as shown on the plans and specifications.

Bid Item No. 50: Sign Panel (Class 2)

(SF)

a. Measurement

The quantity of Sign Panel to be paid for shall be determined by measurement of the number of square feet of Sign Panels (Class 2), including their post and foundation systems, actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Sign Panel shall be in accordance with the City of Colorado Springs Traffic Engineering Signage and Pavement Markings Guidelines and with Section 614 of the CDOT Standard Specifications for Road and Bridge Construction. The Colorado Springs Guidelines manual shall take precedence in the event of conflict between the two specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Bid Item No. 51: Steel Sign Post (2-Inch x 2-Inch)

(LF)

The quantity of Steel Sign Post (2-inch x 2-Inch) to be paid for shall be determined by measurement of the number of linear feet of Steel Sign Post (2-Inch x 2-Inch), including their post and foundation systems, actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Steel Sign Post (2-Inch x 2-Inch) shall be in accordance with the City of Colorado Springs Traffic Engineering Signage and Pavement Markings Guidelines and with Section 614 of the CDOT Standard Specifications for Road and Bridge Construction. The Colorado Springs Guidelines manual shall take precedence in the event of conflict between the two specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Bid Item No. 52: Field Office

(LS)

a. Measurement

Field Office will not be measured, but will be paid for on a lump sum basis for the field facilities actually provided, maintained, and accepted by the Engineer as complying with the plans and specifications.

Field Office shall be in accordance with Section 620 of the CDOT Standard Specifications for Road and Bridge Construction and with the Revision of Section 620 – Field Facilities.

b. Payment

Payment shall be made at the applicable contract lump sum price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to provide and maintain the facility complete with utilities.

Progress payments shall be made according to the following schedule:

1. When the facility has been provided and is completely ready for use at the beginning of the project, as determined by the Engineer, 20% of the amount bid for Field Office will be paid.
2. When 25% of the original contract amount is earned, 40% of the amount bid for Field Office will be paid.
3. When 50% of the original contract amount is earned, 60% of the amount bid for Field Office will be paid.
4. When 75% of the original contract amount is earned, 80% of the amount bid for Field Office will be paid.
5. When 100 % of the original contract amount is earned, 100% of the amount bid for Field Office will be paid.

Payment for restoration of the field office area will not be paid for separately, but shall be included in the cost of the item.

Bid Item No. 53: Construction Surveying

(LS)

a. Measurement

Construction Surveying will not be measured, but will be paid for on a lump sum basis. Construction surveying shall include all items of work involved in conducting construction staking and surveying.

Construction Surveying shall be in accordance with Section 625 of the CDOT Standard Specifications for Road and Bridge Construction, with the Revision of Section 625 – Construction Surveying, and with Colorado Springs General Provisions 108 and Special Provision 8.17 – Staking Work.

b. Payment

Payment shall be made at the applicable contract lump sum price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Payment for construction surveying will be the contract lump sum bid and will be full compensation for all surveying work necessary to complete the project as shown on the plans, to include all resetting of stakes, marks, monuments Secondary and Primary Control points, and preparing supplemental or amended Project Control Diagrams.

Partial payment for construction surveying, as determined by the Engineer, will be made as the work progresses. The Contractor shall submit a schedule of estimated contractor construction surveying time as required on the Survey Tabulation Sheet before the first partial payment is made. Copies of the Survey Records for all completed survey work shall be submitted to the Engineer prior to payment of the monthly estimate.

Before final payment is made, the following two items shall be completed, bear the seal and signature of the responsible PLS or PE identified in subsection 625.01, and have copies submitted to the Engineer for review:

1. All survey records
2. Supplemental or amended Project Control Diagram (a copy of which shall be submitted to the Region Survey Coordinator)

Bid Item No. 54: Right-of-Way Survey Monument

(LS)

a. Measurement

Right-of-Way Survey Monument will not be measured, but will be paid for on a lump sum basis. Right-of-Way Survey Monument shall include all items of work required to locating, preserving, referencing, installing and restoring land monuments actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications

Right-of-Way Survey Monuments shall be in accordance with Section 629 of the CDOT Standard Specifications for Road and Bridge Construction.

b. Payment

Payment for Right-of-Way Survey Monument shall be made at the applicable contract lump sum price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Before payment is made, the following three items shall be completed, bear the seal and signature of the responsible PLS identified in subsection 629.01, and have copies submitted to the Engineer for review prior to being deposited with the county in accordance with Title 38 CRS, Property – Real and Personal, State Board Rules and Policies, MOU, and the CDOT Survey Manual:

1. All survey records
2. The ROW Plans
3. The Project Control Diagram (new, supplemental or amended)

The Pre-survey Conference – equipment calibrations, and survey records will not be paid for separately but shall be included in the work.

Bid Item No. 55: Mobilization

(LS)

a. Measurement

Payment will be according to the following schedule:

1. When 5% of the original contract amount is earned, 20% of the amount bid for mobilization will be paid.
2. When 20% of the original contract amount is earned, 50% of the amount bid for mobilization will be paid.
3. When 35% of the original contract amount is earned, 60% of the amount bid for mobilization will be paid.
4. When 75% of the original contract amount is earned, 100% of the amount bid for mobilization will be paid.

The total sum of all payments shall not exceed the original contract amount bid for the item, regardless of the fact that the Contractor may have, for any reason, shut down the work on the project or moved equipment away from the project and then back again.

Mobilization shall be in accordance with Section 626 of the CDOT Standard Specifications for Road and Bridge Construction.

b. Payment

Payment shall be made at the applicable contract lump sum price for Bid Item and shall include

full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for mobilization shall include, but is not limited to, full compensation for all labor, equipment, tools and materials necessary to mobilize; prepare the project staging area, including stabilized construction access, temporary gravel access path and parking area; removal of temporary facilities and gravel; potholing; cleaning up of site; establishment of sanitary facilities; installation of project construction signs; permitting; and all other costs incurred or labor and operations which must be performed prior to beginning the other items under the contract. Payment shall also include Contractor public relations management and responsibilities, including coordination and regular communications with or notifications to local businesses, property owners, and residences about construction activities that will affect them, project progress, addressing their concerns, etc.

Bid Item No. 56: Property Restoration

(FA)

a. Measurement

Property Restoration will not be measured, but will be paid for on a force account basis for the work performed and accepted by the Engineer as complying with the plans and specifications. The work may include, but is not limited to, items such as landscaping and asphalt patching with the intent to restore areas adjacent to construction areas.

Property Restoration shall be in accordance with the City of Colorado Springs Engineering Division Standard Specifications and the CDOT Standard Specifications for Road and Bridge Construction. The Colorado Springs Specifications shall take precedence in the event of conflict between the two specifications.

b. Payment

Payment for Property Restoration shall be provided on a force account basis in accordance with subsection 109.04 of the CDOT Standard Specifications for Road and Bridge Construction and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Partial payment for Property Restoration, as determined by the Engineer, will be made as the work progresses. The Contractor shall submit a schedule of related work before the first partial payment is made. The schedule shall indicate the itemized time estimated for specific tasks and the total time for the project. The Engineer will use the work schedule to help define the payment schedule. The Contractor shall submit a force account payment invoice for each partial payment. The force account invoice shall itemize each specific task for related to the Property Restoration work for force account payment in accordance with subsection 109.04 of the CDOT Standard Specifications for Road and Bridge Construction.

The Contractor shall be responsible for damage caused by construction operations to the environment, persons, or property. Expenditures associated with actions of the Contractor shall be borne by the Contractor at no cost to the project and the City of Colorado Springs.

Bid Item No. 57: Epoxy Pavement Marking

(GAL)

a. Measurement

The quantity of Epoxy Pavement Marking to be paid for shall be determined by measurement of the number of gallons of epoxy pavement marking actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Epoxy Pavement Marking shall be in accordance with the City of Colorado Springs Traffic Engineering Signage and Pavement Markings Guidelines, with Section 627 of the CDOT Standard Specifications for Road and Bridge Construction, and with the Revision of Section 627 – Pavement Marking included in this specification. The Colorado Springs Guidelines manual shall take precedence in the event of conflict between the two specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for epoxy pavement marking shall include glass beads and cleaning with sandblasting, high-pressure water blast or air blast, as required by the specifications or recommended by the epoxy manufacturer.

Bid Item No. 58: Work Zone Traffic Control

(LS)

a. Measurement

Work Zone Traffic Control will not be measured, but will be paid for on a lump sum basis for all temporary construction traffic control and fencing actually furnished, implemented, maintained, and accepted by the Engineer as complying with the plans and specifications. The Work Zone Traffic Control item shall also include the removal of the City of Colorado Springs existing traffic control and fencing and replacement with the Contractor's traffic control devices and fencing as required to provide a phased transition to the Contractor's approved traffic control plan. The removed City of Colorado Springs traffic control devices and fencing shall be transported to a location designated by the Engineer.

Work Zone Traffic Control shall be in accordance with the City of Colorado Springs Supplement to MUTCD for Traffic Controls for Street Construction, Utility Work, and Maintenance Operations; with Section 800 of the City of Colorado Springs Engineering Division Standard Specifications; and with the Revision of Section 800 – Work Zone Traffic Control.

b. Payment

Payment shall be made at the applicable contract lump sum price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for work zone traffic control shall include contractor preparation, submittals, revisions, permits, and full execution of all approved traffic control plans necessary to complete the project. Payment shall also include removal and transporting of existing City of Colorado Springs traffic control devices and fencing to designated location, all Contractor provided traffic control devices, temporary barriers or attenuators, advanced signage, variable message signs, temporary pavement markings, temporary removal or covering of conflicting permanent signing and striping, flagging operations, moving of traffic control for different phases of work, regular maintenance, traffic control management and supervisor, traffic control inspection, setup and removal of temporary traffic control at the respective beginning and completion of the project, and all other construction traffic control work and elements that are not specifically included in other pay items in the contract.

Bid Item No. 59: Preformed Thermoplastic Pavement Marking

(SF)

a. Measurement

The quantity of Preformed Thermoplastic Pavement Marking to be paid for shall be determined by measurement of the number of square feet of Preformed Thermoplastic Pavement Marking

actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Preformed Thermoplastic Pavement Marking shall be in accordance with the City of Colorado Springs Traffic Engineering Signage and Pavement Markings Guidelines, and with Section 627 of the CDOT Standard Specifications for Road and Bridge Construction. The Colorado Springs Guidelines manual shall take precedence in the event of conflict between the two specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for preformed thermoplastic pavement marking shall include cleaning with sandblasting, high-pressure water blast or air blast, or other surface preparation activities as required by the specifications or recommended by the preformed thermoplastic pavement marking manufacturer.

Bid Item No. 60: Vehicle Tracking Control

(EA)

a. Measurement

The quantity of Vehicle Tracking Control to be paid for shall be the number of Vehicle Tracking Control pads actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Vehicle Tracking Control shall be in accordance with the applicable requirements of the City of Colorado Springs Drainage Criteria Manual, Volume II.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Vehicle Tracking Control shall include all work and materials to furnish, install, maintain, remove, and dispose of this erosion and sediment control item. Payment shall also include the disposal of sediment removed during maintenance of this erosion control item by means and methods approved by the Engineer. Any excavation required to complete the work shall be performed in accordance with Section 200 of the City of Colorado Springs Engineering Division Standard Specifications and will not be paid for separately, but shall be included in the related bid item.

Bid Item No. 61: Construction Fence

(LF)

a. Measurement

The quantity of Construction Fence to be paid for shall be determined by measurement of the number of lineal feet of Construction Fence actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Construction Fence shall be in accordance with the applicable requirements of the City of Colorado Springs Drainage Criteria Manual, Volume II.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Construction Fence shall include all work and materials to furnish, install, maintain,

and remove the item.

Bid Item No. 62: Temporary Slope Drain

(LF)

a. Measurement

The measurement for payment for this item will be the actual number of linear feet of temporary slope drain placed in accordance with the drawings and specifications or as otherwise directed by the Engineer. The unit price will include all of the Contractor's costs. This item includes, but is not limited to, excavating and stockpiling material with appropriate BMPs, furnishing and installing slope drain, backfilling and compacting channel to finished grades, restoring area to pre-project or finished grades, providing all other related and necessary labor, equipment, and materials to complete the work

Temporary Slope Drain shall be in accordance with the applicable requirements of the City of Colorado Springs Drainage Criteria Manual, Volume II.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work.

Bid Item No. 63: Erosion Control Blanket

(SF)

a. Measurement

The measurement for payment for this item will be the actual number of square yards of erosion control blanket measured along the exposed slope (length x width) actually placed and accepted by the Engineer as complying with the plans and specifications. Measurement will not include the material buried in the anchor trenches. No allowance will be made for overlap.

Erosion Control Blanket shall be in accordance with the applicable requirements of the City of Colorado Springs Drainage Criteria Manual, Volume II, and the Revision of Section 02920 of the City of Colorado Springs Parks, Recreation and Cultural Services Department Standard Specifications included these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for furnishing and installing all materials, including the erosion control blanket, anchors, and wood stakes, Preparing subgrade, placing the blanket per manufacturer's specifications, excavating, trenching, backfilling, and compacting for anchoring the blanket, and providing all other related and necessary labor, equipment, and materials necessary to complete and maintain the work.

Bid Item No. 64: Inlet Protection (Curb Sock)

(LF)

a. Measurement

The quantity of Inlet Protection (Curb Sock) to be paid for shall be determined by measurement of the number of inlet protection devices actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Inlet Protection (Curb Sock) shall be in accordance with the applicable requirements of the City of Colorado Springs Drainage Criteria Manual, Volume II.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Inlet Protection (Curb Sock) shall include all work and materials to furnish, install, maintain, remove, and dispose of this erosion and sediment control item. Payment shall also include the disposal of sediment removed during maintenance of this erosion control item by means and methods approved by the Engineer.

Bid Item No. 65: Rock Sock / Wattle

(LF)

a. Measurement

The quantity of Rock Sock /Wattle to be paid for shall be the number of Rock Sock / Wattles actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Rock Sock / Wattles shall be in accordance with the applicable requirements of the City of Colorado Springs Drainage Criteria Manual, Volume II.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Rock Sock / Wattle shall include all work and materials to furnish, install, maintain, remove, and dispose of this erosion and sediment control item. Payment shall also include the disposal of sediment removed during maintenance of this erosion control item by means and methods approved by the Engineer.

Bid Item No. 66: Sediment Control Log

(LF)

a. Measurement

The quantity of Sediment Control Log to be paid for shall be determined by measurement of the number of linear feet of Sediment Control Log actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Sediment Control Log shall be in accordance with the applicable requirements of the City of Colorado Springs Drainage Criteria Manual, Volume II.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Sediment Control Log shall include all work and materials to furnish, install, maintain, remove, and dispose of this erosion and sediment control item. Payment shall also include the disposal of sediment removed during maintenance of this erosion control item by means and methods approved by the Engineer.

Bid Item No. 67: Stockpile Management with Protection

(EA)

a. Measurement

The quantity of Stockpile Management with Protection to be paid for shall be the number of Stockpile Management with Protection actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Stockpile Management with Protection shall be in accordance with the applicable requirements of the City of Colorado Springs Drainage Criteria Manual, Volume II.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Stockpile Management with Protection shall include all work and materials to furnish, install, maintain, remove, and dispose of this erosion and sediment control item. Payment shall also include the disposal of sediment removed during maintenance of this erosion control item by means and methods approved by the Engineer.

Bid Item No. 68: Concrete Washout Area

(EA)

a. Measurement

The quantity of Concrete Washout Area to be paid for shall be determined by measurement of the number of washout structures actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Concrete Washout Area shall be in accordance with the applicable requirements of the City of Colorado Springs Drainage Criteria Manual, Volume II.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for concrete washout area shall include all work and materials to furnish, install, maintain, remove, and dispose of this erosion and sediment control item. Payment shall also include the removal, hauling, and off-site disposal of waste material from concrete washout operations.

Bid Item No. 69: Permanent Seeding

(Acre)

a. Measurement

The quantity of Permanent Seeding to be paid will be determined by measurement of the number of acres of Permanent Seeding actually placed. Permanent Seeding must be accepted in the field by the Engineer as complying with the plans and specifications. To verify installation of appropriate seed quantities, Contractor will provide delivery slips for seed as provided by the seed supplier.

Permanent Seeding work shall be in accordance with Section 02920 of the City of Colorado Springs Parks, Recreation, and Cultural Services Department Standard Specifications and the revisions to Section 02920 in these specifications.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials, including water, mulching, and protection of seeding areas necessary to complete the work. Payment shall also include maintenance of the seeding areas until Final Acceptance is given, as per the project specifications

Bid Item No. 70: Erosion Control Supervisor

(Days)

a. Measurement

The quantity Erosion Control Supervisor to be paid shall be determined by the number of days of Erosion Control Supervisor management and inspection services actually performed and accepted by the Engineer as complying with the plans and specifications.

Erosion Control Supervisor shall be in accordance with the applicable requirements of the City of Colorado Springs Drainage Criteria Manual, Volume II.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all stormwater management labor, inspections, reports, plans, equipment, tools, and materials necessary to complete the work.

Bid Item No. 71: Sanitary Sewer PVC Pipe (8-INCH)

(LF)

a. Measurement

The quantity of Sanitary Sewer PVC Pipe (8-Inch) shall be paid for on a unit price basis and shall be measured by the number of linear feet of Sanitary Sewer PVC Pipe (8-Inch) actually furnished and installed, and accepted by the Engineer, as complying with the plans and specifications. The length of the Sanitary Sewer PVC Pipe (8-Inch) shall be measured for payment after installation, on the basis of the pipeline stationing as determined by the pipeline installation surveys, with all stations carefully measured horizontally. The measurement of the length of each line or run of pipe of shall begin and end at:

1. The center of the manhole,
2. The point of connection to any pipe or fitting installed under another contract,
3. The end of the pipe, where not connected to any other pipe, manhole, or special under this Contract.

Sanitary Sewer PVC Pipe (8-Inch) shall be in accordance with the Colorado Springs Utilities Waste Water Line Extension and Service Standards.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Sanitary Sewer PVC Pipe (8-Inch) shall include all work associated with submittals, pipe manufacture, transportation, storage, layout, utility locates, trench excavation, hauling and disposal, pipe zone material, pipe installation, fittings, backfill, compaction, pipeline marking tape; tracer wire and associated lead boxes; and testing, complete in place.

Bid Item No. 72: Connect to Existing Sanitary Manhole

(EA)

a. Measurement

The quantity of Connect to Existing Sanitary Manhole shall be paid by each for the number of Connect to Existing Sanitary Manhole actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Connect to Existing Sanitary Manhole shall be in accordance with the Colorado Springs Utilities Waste Water Line Extension and Service Standards.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Connect to Existing Sanitary Manhole shall include all utility locates, excavation, hauling and disposal, removal of existing pipe, pipe to manhole connections, fill concrete and grout for invert shaping, joint sealants, backfill, compaction and testing, complete in place.

Bid Item No. 73: 4-Foot Diameter Sanitary Manhole

(EA)

a. Measurement

The quantity of 4-Foot Diameter Sanitary Sewer Manhole shall be paid by each for the number of 4-Foot Diameter Sanitary Manholes actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

4-Foot Diameter Sanitary Manhole shall be in accordance with the Colorado Springs Utilities Waste Water Line Extension and Service Standards.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for 4-Foot Diameter Sanitary Manhole shall include all work associated with the submittals, manufacture, transportation of materials, storage, layout, utility locates, excavation, hauling, disposal, sub-grade preparation, backfilling and compaction, interior coatings, exterior coatings, pipe to manhole connections, fill concrete and grout for invert shaping, steps, rings and covers, joint sealants, and all other items required to complete manhole installation complete in place.

Bid Item No. 74: Install Controlled Low-Strength Material Encasement

(CY)

a. Measurement

The quantity of Install Controlled Low-Strength Material (CLSM) Encasement shall be paid for on a unit price basis and shall be measured by the number of cubic yards of CLSM Encasement actually furnished and installed, and accepted by the Engineer, as complying with the plans and specifications.

Installation of CLSM Encasement shall be in accordance with the Colorado Springs Utilities Waste Water Line Extension and Service Standards.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Install Controlled Low-Strength Material Encasement shall include all utility locates, excavation, hauling and disposal, forming and blocking, utility support, placement of CLSM, backfill, compaction and testing, complete in place.

Bid Item No. 75: 12-Inch PVC Waterline (w/ Restrained Joints)

(LF)

a. Measurement

The quantity of 12-Inch PVC Waterline (w/ Restrained Joints) shall be paid for on a unit price basis and shall be measured by the number of linear feet of 12-Inch PVC Waterline (w/Restrained Joints) actually furnished and installed, and accepted by the Engineer as complying with the plans and specifications. The length of the 12-Inch PVC Waterline (w/ Restrained Joints) shall be measured for payment after installation, on the basis of the pipeline stationing as determined by the pipeline installation surveys, with all stations carefully measured horizontally. The measurement of the length of each line or run of pipe shall begin and end at the point of connection to any pipe or fitting installed under this or another contract.

12-Inch PVC Waterline (w/ Restrained Joints) shall be in accordance with the Colorado Springs Utilities Water Line Extension and Service Standards.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for 12-Inch PVC Waterline (w/ Restrained Joints) shall include all work associated with submittals, pipe manufacture, transportation, storage, layout, utility locates, trench excavation, hauling and disposal, pipe zone material, pipe installation, fittings, restraint devices, backfill, compaction, pipeline marking tape; tracer wire and associated lead boxes; and testing, complete in place.

Bid Item No. 76: 12-Inch MJ Solid Sleeve

(EA)

a. Measurement

The quantity of 12-Inch MJ Solid Sleeve shall be paid for on a unit price basis and by each for the number of 12-Inch MJ Solid Sleeves actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

12-Inch MJ Solid Sleeve shall be in accordance with the Colorado Springs Utilities Water Line Extension and Service Standards.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for 12-Inch MJ Solid Sleeve shall include all work associated with the submittals, manufacture, transportation of materials, storage, layout, utility locates, excavation, hauling, disposal, backfilling and compaction, connection to adjacent pipe, restraint devices, backfill, compaction, and testing, complete in place.

Bid Item No. 77: Disinfection Support

(LS)

a. Measurement

The quantity of Disinfection Support will not be measured, but will be paid on a lump sum basis for all work to complete all Disinfection Support services actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Disinfection Support shall be in accordance with the Colorado Springs Utilities Water Line Extension and Service Standards.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Disinfection Support shall include furnishing, installing, and handling all required labor, equipment, and materials to acquire and deliver potable water, temporary water meter, line filling of the new pipeline, water quality testing, discharge and/or hauling of test water, and temporary erosion control facilities associated with test water discharge. Payment shall also include any re-excavation, backfill, and pavement restoration, as necessary, to facilitate disinfection and testing.

Bid Item No. 78: 24-Inch Steel Waterline (w/ Welded Joints)

(LF)

a. Measurement

The quantity of 24-Inch Steel Waterline (w/ Welded Joints) shall be paid for on a unit price basis and be measured by the number of linear feet of 24-Inch Steel Waterline (w/ Welded Joints) actually furnished and installed, and accepted by the Engineer as complying with the plans and specifications. The length of the 24-Inch Steel Waterline (w/ Welded Joints) shall be measured for payment after installation, on the basis of the pipeline stationing as determined by the pipeline installation surveys, with all stations carefully measured horizontally. The measurement of the length of each line or run of pipe shall begin and end at the point of connection to any pipe or fitting installed under this or another contract,

24-Inch Steel Waterline (w/ Welded Joints) shall be in accordance with the Colorado Springs Utilities Water Line Extension and Service Standards as amended and supplemented herein.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for 24-Inch Steel Waterline (w/ Welded Joints) shall include all work associated with submittals, pipe fabrication and production, including lining and coating, factory testing, certifications, inspections, transportation, storage, layout, utility locates, trench excavation, hauling and disposal, pipe zone material, pipe installation, fittings, joint welding, backfill, compaction, field completion of joint linings and coatings, pipeline marking tape; and testing, complete in place.

Bid Item No. 79: Butt Strap Connection to Existing 24-Inch Steel Waterline (EA)

a. Measurement

The quantity of Butt Strap Connection to Existing 24-Inch Steel Waterline shall be paid for on a unit price basis and by each for the number of Butt Strap Connection to Existing 24-Inch Steel

Waterline actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Butt Strap Connection to Existing 24-Inch Steel Waterline shall be in accordance with the Colorado Springs Utilities Water Line Extension and Service Standards as amended and supplemented herein.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Butt Strap Connection to Existing 24-Inch Steel Waterline shall include all work associated with the submittals, manufacture, transportation of materials, storage, layout, utility locates, excavation, hauling, disposal, connection to adjacent pipe, joint welding, backfill, compaction, field completion of joint linings and coatings, and testing, complete in place.

Bid Item No. 80: 24-Inch Dished Bulkheads (Temporary)

(EA)

a. Measurement

The quantity of 24-Inch Dished Bulkheads (Temporary) shall be paid for on a unit price basis and by each for the number of 24-Inch Dished Bulkheads (Temporary) actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

24-Inch Dished Bulkheads (Temporary) shall be in accordance with the Colorado Springs Utilities Water Line Extension and Service Standards as amended and supplemented herein.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for 24-Inch Dished Bulkheads (Temporary) shall include all work associated with the submittals, manufacture, transportation of materials, storage, layout, utility locates, excavation, hauling, disposal, connection to adjacent pipe, joint welding, removal after hydrostatic testing, backfill, compaction and testing, complete in place.

Bid Item No. 81: Hydrostatic Testing

(LS)

a. Measurement

The quantity of Hydrostatic Testing will not be measured, but will be paid on a lump sum basis for all work to complete all Hydrostatic Testing actually furnished, installed, and accepted by the Engineer as complying with the plans and specifications.

Hydrostatic Testing shall be in accordance with the Colorado Springs Utilities Water Line Extension and Service Standards as amended and supplemented herein.

b. Payment

Payment shall be made at the applicable contract unit price for Bid Item and shall include full compensation for all labor, equipment, tools, and materials necessary to complete the work. Payment for Hydrostatic Testing shall include furnishing, installing, and handling all required labor, equipment, and materials to acquire and deliver suitable water, temporary water meter, line filling of the new pipeline, hydrostatic pressure testing, discharge of test water, and temporary erosion control facilities associated with test water discharge. Includes any re-excavation, backfill, and pavement restoration, as necessary, to facilitate hydrostatic testing.

Bid Item No. 82: Minor Contract Revisions

(FA)

a. Measurement

For work items required by the project and not identified as incidental to the work, a Minor Contract Revision may be initiated by and at the sole discretion of the Engineer. The intent of the MCR is to provide a mechanism for payment for minor work required to complete the project not identified elsewhere in the contract documents. If not deemed minor by the Engineer, the Contractor may be required to prepare a formal change order through the City process identified in the contract documents. Contractor may not submit Minor Contract Revisions without prior approval of the Engineer. The MCR should be completed and signed by the Contractor and Engineer prior to the start of the added or changed work. The Engineer is responsible for approving all change orders.

b. Payment

Payment will be made for Minor Contract Revisions at the agreed upon price for the work completed and shall include full compensation for all labor, equipment, tools, materials and warranty necessary to complete the work.

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